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TRAINING SCHOOL GIRLS FOR DOMESTIC PROFICIENCY.

THE framers of The Agricultural Instruction Act had a further object than the development of proficiency in the art of agriculture. Better crops, improving live stock and greater prosperity for the rural community were but incidental to the achievements looked for from the work to be accomplished with the ten millions of dollars placed at the disposal of the provinces to be devoted to rural instruction during the ten years ending on March 31st, 1923.

The development of a rural citizenship was the ultimate aim and on this depends not only a bettered economic condition in so far as the activities of men are concerned but a womanhood better equipped to fulfil the destinies that belong to her. In apportioning the grants each year the needs of the whole range of the rural population have been kept in mind not in the direction of providing special institutions but in expanding and adjusting the available working force and equipment so as to meet effectually the needs of the present day rural life.

Until federal assistance was afforded for rural education household science instruction was considered quite outside the range of the country school and it has taken time to convince the educational heads that there is room in the already crowded curriculum for this very practical subject. The progress made has not been uniform over Canada, indeed one western province has gone quite in advance of the other parts of the Dominion in dealing effectively with the question. Other provinces are working out ambitious plans and it will not be long before our farm-raised girls will leave the rural school not only informed on proper methods in home-making, and all that it implies, but inspired as never before with the responsibilities that will devolve upon woman in her domestic sphere in the readjustment period and afterwards. The commendable progress being made by Ontario in developing household science instruction in the rural school with Agricultural Instruction Act appropriations, was shown in THE AGRICULTURAL GAZETTE of August last. In this number, in Part III, six of the other provinces reveal the plans they have under way for the training of country maidens for domestic proficiency.

THE LIVE STOCK SITUATION

BY H. H. THOMSON, CHAIRMAN, CANADA FOOD BOARD

EIGHT countries in Europe alone show an ascertainable decrease of 50,000,000 head of cattle, sheep, and pigs since war broke out. These figures do not take into consideration the complete wiping out of all stocks down to chickens in Belgium, Serbia, Roumania, and the many small republics that have sprung up along the old German-Russian frontier. It is safe to assume that at least another 50,000,000 head have disappeared from these lands.

A recent calculation showed the probable decrease throughout Europe, compared with pre-war conditions, to be:—

Cattle.	28,000,000
Sheep .	54,500,000
Swine	32,500,000
Total	115,000,000

Yet in this, there is not even a guess as to the ruin wrought in Turkey, Bulgaria, and among the small peoples of Asia Minor, right away from the Dardanelles to the Caucasian Mountains, and down through Palestine and along the Mesopotamia waters to the Persian Gulf.

Decreases which have been made public by the Inter-Allied Food Commission since the signing of the last armistice are:

Country.	Pre-war Total	Decrease
	Cattle	Cattle
France	14,787,600	2,366,000
Italy	6,646,000	996,000
Denmark	2,462,800	344,700
Sweden	2,722,500	598,900
Holland	2,096,500	
Germany	21,828,000	2,182,800
Austria	9,160,000	
Hungary	6,028,000	
	Sheep	Sheep
United Kingdom	27,886,000	2,788,600
France	16,131,000	2,258,300
Italy	13,824,000	138,000
Denmark	514,000	46,200
Sweden	973,400	
Holland	842,000	199,900
Germany	5,471,000	
Austria	2,428,000	
Hungary	7,696,000	
	Pigs	Pigs.
United Kingdom	3,939,000	984,200
France	7,035,000	2,814,000
Italy	2,722,000	353,800
Denmark	2,496,700	1,872,300
Sweden	977,600	351,900
Holland	1,350,000	162,000
Germany	25,341,000	19,305,750
Austria	6,432,000	
Hungary	6,415,000	

This, then, is the need in the Trans-Atlantic world.

What of Canada's ability to supply these grave and pressing deficiencies in live stock? If our farmers will take the matter up seriously, they have a golden chance. Sir William Goode, of the British Ministry of Food, cabled the Canada Food Board late in December that there would be an insistent demand in



H. B. THOMSON, CHAIRMAN CANADA FOOD BOARD

Great Britain for overseas supplies; that, owing to the universal reduction of pigs, the world production of bacon, hams, pork, and lard was unequal to the demand, and that the milk yield was almost at a vanishing point in Central Europe, Holland, Switzerland, and Scandi-

navia, countries which were normally large exporters of dairy produce. The number of cattle, sheep and pigs in Canada has increased since June, 1914. In fact, the number of cattle has risen from 6,036,000 to 7,920,000.

Farmers should not forget that Canada before the war annually produced one-sixteenth of the world's supply of wheat. That shows us the relative size of the market, and is a measure by which our live stock men can gauge their own opening. But in live stock the Dominion lags far behind. It has hitherto only produced enough to feed its own population. Mexico, with a population not quite twice that of the Dominion, annually exports four and a half times as many cattle. Argentina, farther away from European markets, and hampered by a 7,000 mile ocean route across the Equator, and with a smaller population than Canada, exports five times as much mutton, and four hundred times as much beef. Denmark, with a population of less than 3,000,000 people, with an area of only 15,300 square miles, i.e., about one-half the size of New Brunswick and about one-eighteenth the size of Alberta, annually exports four times as much pork products as does the Dominion. But when we come to Australia shipping 3,000 times as much mutton, and little New Zealand shipping 4,000 times as much, our Dominion trade seems to fade out of sight.

These considerations should be enough to show that our Canadian live stock development has only just begun.

PART I

Dominion Department of Agriculture

THE DOMINION EXPERIMENTAL FARMS

THE DIVISION OF CHEMISTRY

THE "ALKALI" CONTENT OF SOILS AS RELATED TO CROP GROWTH*

BY FRANK T. SHUTT, M.A., D.SC., AND E. A. SMITH, M.A.

THE nature, concentration, and distribution of alkali as occurring in soils of certain semi-arid districts of Western Canada, have been studied during the past five years in the laboratories of the Experimental Farm system. The work has included the analysis of several hundreds of soil groups collected chiefly in tracts about to be placed under irrigation in Southern Alberta. The data so obtained have materially assisted the Government in the classification of the areas in question into irrigable and non-irrigable lands. For the purpose of applying these data, American standards as regards safe limits of alkali have largely been used. The results presented in this paper are a contribution towards the establishment of standards more particularly adapted to Canadian conditions.

THE NATURE AND FORMATION OF SOILS IN GENERAL

Arable soils are made up of two great classes of constituents: (1) mineral, as derived from the disintegration and partial decomposition of rock material; and (2) vegetable matter, the semi-decomposed remains of past generations of plant life, commonly known as humus. It is from the former that the stores of lime, phosphoric acid, potash, etc.,

*Read before Chemistry and Physics Section Royal Society, May, 1918.

present in the soil are furnished, while the latter supplies the nitrogen required for crop growth and at the same time acts as an important factor in supporting bacterial life and in regulating the temperature, the moisture-content and the aeration of the soil.

Soil formation is not merely a matter of the past; it is now going on. Under natural conditions, as in the forests, our soils are being constantly enriched in humus from decaying roots, fallen leaves—from the death and decay of vegetation generally, and, further, by physical changes and chemical reactions, favoured by warmth, moisture, carbonic acid of the atmosphere, etc., the rock elements of the soil are being continually, though slowly, desintegrated and decomposed, giving rise to soluble mineral compounds, some of which may be useful and others injurious to plant life.

THE FORMATION OF ALKALI

In humid districts, i.e., those enjoying a more or less generous rainfall, the mineral salts formed by these processes, known popularly as "weathering", are practically disposed of as produced. In part they are utilized by vegetation, and any remaining injurious salts leach downwards and drain away; the conditions are such that there can be no accumulation of them in the surface soil.

But such is not always or necessarily the case in arid or semi-arid districts. Here we find the scanty rainfall, while sufficient to promote the formation of these soluble mineral salts, quite inadequate to their removal by drainage. If they descend a few inches, or even a few feet, there is not enough flow of water through the soil to carry them right away and, subsequent evaporation of the water that holds them in solution, and the action of capillarity brings them to the surface, where they accumulate, forming the so-called alkali, and rendering the soil more or less unsuitable for agricultural purposes. The alkali may impregnate the sub-soil, the surface soil, or if evaporation greatly exceeds the rainfall, it may appear as an incrustation or efflorescence.

Alkali soils, therefore, are characteristic of arid or semi-arid districts only, and these in Canada may be said to be restricted chiefly to certain areas in British Columbia, Southern Alberta, and Southwestern Saskatchewan.

NATURE OF "ALKALI"

The compounds known collectively as alkali comprise chiefly sodium sulphate, sodium carbonate, sodium chloride, magnesium sulphate, calcium sulphate (gypsum) when present in large quantities, and occasionally chlorides of calcium and magnesium. Sulphate and chloride of sodium and sulphate of magnesium and calcium when crystallized on the surface of the soil, appear as white substances, and constitute what is known as "white alkali". "Black alkali" is characterized by the presence of sodium carbonate, though this compound is almost always associated with one or more of the sulphates mentioned above. Sodium carbonate is, as is well known, white, but from the fact that it acts upon and dissolves the decayed vegetable matter (humus) of the soil the incrustation is dark brown or black. Hence the name. Water standing in pools

on soils impregnated with sodium carbonate is invariably of a dark colour resembling a strong infusion of coffee.

EFFECTS OF ALKALI ON PLANTS

The soil water of lands impregnated with alkali is a more or less concentrated solution of these compounds. It is the soil moisture which assists in the germination of the seed and is the means of conveying food to the plant rootlets; for the performance of these important functions it is obvious that it should possess no injurious properties. The effect of a solution such as we find in alkali soils on the cells in the tissues of the roots is to extract or withdraw from them by osmosis their natural water. As a result the cells lose their turgidity, their protoplasmic contents shrink from the cell wall, the plant wilts, and death may ensue. The higher the percentage of alkali—in other words, the more concentrated the solution—the more severe the effect in this direction. Chlorides are more injurious than sulphates.

"Black" alkali is much more injurious than "white" alkali. The sodium carbonate it contains is directly corrosive, causing injury at the base of the trunk or root crown of the plant, by cutting into and eating away the tissues. The bark of green herbaceous stems is usually turned to a brownish tinge for half an inch or more immediately above the surface of the ground so as to be coming soft and easily peeling off. The rough bark of trees is found to be almost black, and the green layer underneath brown. Very small quantities are sufficient to prevent seed germination, or to destroy the tender rootlets of the seedling, if the young plant appears.

All kinds of alkali have a tendency to destroy a soil's tilth, but this is particularly marked in the case of black alkali. The soil readily puddles, flocculation, or the property of forming flakes, is destroyed and the land becomes in a large degree

impervious to water. On drying hard refractory masses are formed and the soil is extremely difficult to work. Very frequently a hard, practically an impenetrable hardpan forms under such soils, making it almost impossible to put in a system of tile sub-drainage.

Crops differ greatly in their susceptibility to alkali; some are so resistant that they may thrive and come to maturity on soils, that for the majority of farm crops there can be no possible hope of success. Apart however, from this question of relative resistancy of crops, the composition, concentration and vertical distribution of the alkali and the physical character of the soil are all important matters in reaching a conclusion as to the desirability and safety of placing an affected area under irrigation. Injudicious or excessive application of irrigation water to soils impregnated with alkali, especially if the subsoil is of an impervious character and sub-drainage is not provided, may ruin by bringing up alkali what would otherwise be excellent land for cultivation under dry farming methods. The irrigation of impregnated land without efficient drainage—natural or artificial—almost invariably gives rise to "rise of alkali" and this—in the past has been a fruitful cause of the ruination in the Western States of large areas of once cultivable, fertile soil.

LIMITS OF TOXICITY

The present paper records the results of the analysis of five series of soil groups, each series consisting of three groups representative of

land upon which (1) there was fair or good growth, the concentration of the alkali, if present, being apparently and for practical purposes negligible, (2) there was poor growth, the crop evidently being distressed by, alkali and (3) there was no growth due to excess of alkali. Each series represents a separate tract of land (or field), the three groups being frequently collected within a short distance of one another. As in all our work in connection with the Irrigation tracts each group consisted of five samples: A 0' 0"-0' .5', B 0'-.5 - 1' .5, C 1' .5 3' .0 and D 3' 0"-5' 0.

WESTERN RYE GRASS

Series 1.—Sec. 20, Tp. 9, R. 27, W. of 3rd Meridian.

Field of Western Rye grass about 18 miles southwest of Maple Creek, Sask. The land had been under irrigation for 6 years, during which time the bare alkali spots or patches had increased in size very considerably. Had been sown to wheat 1910, oats 1911, and seeded to Western Rye grass. Crop at time of visit, July 4, 1917, was only fair on better parts of field, the plants being from 4 to 6 inches in height. Soil a dark brown almost black moderately light loam, of good quality; subsoil of heavier character, a dark grey to yellow grey clay with a little sand. Water table, from 3 to 5 feet, according to contour of land. One group of samples taken from a bare spot, the second in sparse and meagre growth, about 15 feet distant, and the third in the best growth, about 80 feet from the same point of collection.

WESTERN RYE GRASS

Series I.

Sec. 20, Tp. 9, Rg. 27, W. of 3rd Meridian.

Group No.	Depth	Growth	Na ₂ SO ₄	Mg SO ₄	CaSO ₄	Total soluble Saline content
1603	0'.0—0'.5	Fair to Good	.089	.....	.....	.128
	0'.5—1'.5		.073	.....	.....	.120
	1'.5—3'.0		.085	.....	.....	.168
	3'.0—5'.0		.641	.504	1.307	2.436
1602	"	Poor	.117	.....	.....	.152
			.254	.....	.....	.300
			.618	.....	.....	.770
			.980	.580	1.376	3.016
1601	"	No	1.109	.279	.233	1.748
			1.033	.309	.272	1.656
			.964	.066	.104	1.200
			1.189	.210	.304	1.756

Discussion of Results.—The impregnation is white alkali, the chief constituent being sodium sulphate. Magnesium sulphate is present in certain of the members, but chlorides are absent, save in traces, throughout the series. In samples D (3'.0-5'.0) of two of the groups calcium sulphate is present in considerable amounts. This compound cannot properly be classed as alkali, though it is somewhat open to question if it is altogether inert towards growing vegetation when present in amounts approaching 1 per cent.

Group 1603. Fair to good growth. The sodium sulphate content is very low, and practically uniform to a depth of 3'.0, the amount in A.B. and C being less than .1 per cent, which is usually regarded as negligible.*

In D (3'.0-5'.0) there is a serious increase of this salt, to .641 per cent, accompanied by .504 per cent magnesium sulphate. It is doubtful, if at this depth, this alkali markedly affects the grass crop; the danger of its presence lies in the possibility of its rise by irrigation.

Group 1602. Meagre and distressed growth. The percentages of sodium sulphate are considerably higher than in the corresponding members

of the preceding group, ranging from .117 per cent to .980 per cent, the increase being steady and marked from A (0'.0-0'.5) to D (3'.0-5'.0).

Judging from the sparse and meagre appearance of the crop we might conclude that in this group we closely approach, for Western Rye grass, the limits for tolerance.

Group 1601. No growth. Soil bare. The percentages of sodium sulphate throughout closely approximate 1.0, the concentration being fairly uniform from the surface to the depth of 5 feet. Notable amounts of magnesium sulphate are present in all the members of this group, save C (1'.5-3'.0).

The alkali impregnation of this group far exceeds the extreme limit of tolerance for ordinary farm crops.

NATIVE PRAIRIE GRASS

Series II. Sec. 9, Tp. 11, R. 25, W. of 3rd Meridian.

From irrigated field 7 miles south-east of Maple Creek, Sask. The land had been under irrigation for a number of years, but had never been

*Less than 2 per cent sodium sulphate, unless concentrated in the first foot, is regarded by most American authorities as not injuriously affecting ordinary farm crops.

cultivated, the native grass being cut and cured as hay. The surface soil was a fairly good sandy loam, the sub-soil of heavier nature, con-

taining a considerable proportion of clay. In the best parts of the field the grass was of good growth. Samples collected July 6th, 1917.

NATIVE PRAIRIE GRASS

Series II.

Sec. 9, Tp. 11, R. 25, W. of 3rd Meridian.

Group No.	Depth	Growth	Na ₂ O	Mg SO ₄	Ca SO ₄	Total Soluble Saline Content
1606.....	0'.0—0'.5	Good	.070	.....	.....	.136
	0'.5—1'.5		.641	.104	.128	.916
	1'.5—3'.0		.731	.109	.109	.960
	3'.0—5'.0		.541	.185	.136	.864
1605.	"	Poor	.432	.....	.110	.584
			1.001	.272	.136	1.428
			.765	.....	.066	.920
			1.662	.. ..	.825	2.696
1604.....	0'.0—0'.5	No	2.407	.578	.....	3.108
	0'.5—1'.5		2.175	.501	.216	2.768
	1'.5—2'.8		2.454	.378	.527	3.360

Discussion of Results.—In this, as in Series I, the alkali is chiefly sodium sulphate, but magnesium sulphate is also present in notable amounts, especially in Group 1604, characterized by "no growth."

Group 1606. Good growth. The sodium sulphate in A (0'.0-0'.5) is present in negligible amounts, but in the lower members of this group it reaches percentages ranging from .541 (in D) to .731 (in C), accompanied by small amounts of magnesium sulphate.

It might be inferred from these facts that provided the alkali in the first 6 inches of soil were negligible and that it did not exceed 0.7 per cent from 1'.5-5'.0, that native prairie grass might be expected to make a good growth, without any marked distress.

Group 1605. Poor and meagre growth. The concentration of sodium sulphate in A (0'.0-0'.5) is 0.432 per cent, but increases markedly in the lower members of that group, amounting to 1.662 per cent in D.

This distribution of alkali probably represents the limits of tolerance for native prairie grass under irrigation. An amount approaching 0.5 per cent in the first 6 inches, underlain by soil containing 1 per cent or more, of alkali would seem to be the extreme conditions under which the native grass might be expected to yield a crop. It is interesting to note, comparing the two series discussed, that the native prairie grasses are more alkaline resistant than Western Rye grass.

Group 1604.—No growth. Soil bare. The percentage of sodium sulphate throughout this group exceed 2.07, an impregnation too high to permit of any growth.

NOTE.—The samples in this group represent a depth only of 2'.8, collection below the depth being made impossible by that caving in of the sides of the sampling bore.

OATS

Series III.—Sec. 17, Tp. 24, R. W. of 4th Meridian.

These three soil groups were collected on July 17th, 1917, from a field in oats on Farm No. 8, Namaka Colony about $4\frac{1}{2}$ miles Northeast of Strathmore, Alberta. The area had been under irrigation for some years but water had not been applied

in 1917. The soil was a sandy loam of good quality. The yield of oats on the best parts of the field would be probably 75 bushels per acre; the portions showing distressed growth the yield would probably be scarcely worth the harvesting.

OATS

Series III.

Sec. 17, Tp. 24, R. 24, W. of 4th Meridian.

Group	Depth	Growth	Na ₂ CO ₃	Na ₂ SO ₄	Mg SO ₄	Total Soluble Saline Content
1620.....	0'.0—0'.5	Good	.061	.....	.....	.128
	0'.5—1'.5		.065	.....	.....	.112
	1'.5—3'.0		.065	.....	.....	.136
	3'.5—5'.0		.060	.....	.....	.132
1619.....	"	Poor	.212	.108	.087	.480
			.149	.....	.138	.276
			.128	.....	.096	.232
			.077	.....	.066	.164
1618.....	"	No	.340	.343	.087	.842
			.292	.....	.087	.448
			.210	.....	.090	.312
			.128	.....	.077	.252

Discussion of Results—The alkali of this group is sodium carbonate, the characteristic salt of "black alkali" and, which, as already stated, is the most injurious of all saline impregnations. The limits of tolerance for most farm crops are usually placed by American authorities between .05 and .10 per cent.

The soil of group 1620 carried a good crop of oats and contained uniformly to a depth of 5 feet .06 per cent of sodium carbonate, in addition to trifling amounts of other and less injurious saline matter. These results must not be interpreted as proving that this concentration of sodium carbonate is harmless, but they are of peculiar significance in showing that this impregnation does not appreciably distress the oat crop on a light sandy soil well supplied with humus.

In group 1619 the concentration of alkali is highest in the surface soil (A—.212 per cent), decreasing stead-

ily in the lower samples (D—.077 per cent). The growth was very sparse and poor, and it was evident that the limit of tolerance had been passed.

The samples of group 1918, taken from a location in the same field and absolutely bare of vegetation, show a very heavy impregnation of sodium carbonate, the highest concentration, .340 per cent, being found in the surface soil A, and decreasing with depth of sampling to .128 per cent in D.

A feature worthy of note in connection with these two latter groups is that the alkali is strongest in the surface soil, decreasing steadily and more or less uniformly, to the depth of sampling, 5 feet.

WHEAT

Series IV.—Sec. 3, Tp. 5, R. 22, W. of 4th Meridian.

The samples of this series were collected in a wheat field three miles north of Magrath, Alberta. The area was not under irrigation. The yield for the field at the date of this visit, August 8th, 1917, was estimated at

15 bushels per acre; in 1916 the yield of wheat was stated at 55 bushels per acre. The surface soil was a brown loam of fairly good quality, the subsoil a rather heavy clay.

WHEAT

Series IV.

Sec. 33, Tp. 5, R. 22, W. of 4th Meridian.

Group	Depth	Growth	Na ₂ SO ₄	Mg SO ₄	Ca SO ₄	Total Soluble Saline Content
1634	0'·0—0'·5	Good				
	0'·5—1'·5		·178	·087	·163	·440
	1'·5—3'·0		·877	·132	·447	1·572
	3'·0—5'·0		·973	·563	2·926	4·640
1633	"	Poor	·123			·180
			·701	·247	·491	1·480
			·719	·309	·588	1·680
			·799	·062	·192	1·060
1632	"	No	1·741	·900	·648	3·260
			1·001	·323	·364	1·700
			·701	·222	·220	1·164
			·579	·084	·192	·900

Discussion of Results.—This is a case of white alkali, the percentages of sodium sulphate being accompanied with notable amounts of magnesium sulphate.

In group 1634 good growth "A," representing the first 6 inches is free, or practically free, of alkali. "B" (0'·5-1'·5) contains a notable though not heavy impregnation, the percentage of sodium sulphate slightly exceeding, according to most authorities, the usual limit of tolerance for the vigorous growth of ordinary crops. In "C" and "D" the alkali content is very large.

Group 1633, representative of the area carrying a meagre and poor growth, is of particular interest in indicating probably the limit of tolerance for wheat. In the first 6 inches sodium sulphate is present in an amount that would no doubt cause some distress, but would not inhibit all growth. But in B., C., and D there is a very marked increase in this salt, accompanied by magnesium sulphate, the totals being such as to entirely prevent root extension.

The crop is therefore limited as to its foraging ground to the immediate surface soil.

Group 1632 contains in A (0' 0-0' 5) 1·741 per cent sodium sulphate and ·900 per cent magnesium sulphate. This concentration of alkali is absolutely inhibitive for wheat, and indeed renders the soil worthless for common crops. The salts gradually decrease in amount to the 5 foot depth but in every instance the impregnation greatly exceeds the limit of tolerance.

ONIONS

Series V.—Lot 27-476, Summerland, B.C.

This series was taken from an onion field about 4 miles southwest of Summerland, Okanagan Valley, B.C. The area has been under irrigation for a number of years. The surface soil is a dark brown sandy loam well supplied with vegetable matter, the subsoil a sand mixed with silty clay. Samples were collected August 25th, 1917.

ONIONS

Series V.

Lot 27-476, Summerland, B.C.

Group	Depth	Growth	Na ₂ CO ₃	Total Soluble Saline Content
1628.	0'.0—0'.5	Good	.135	.180
	0'.5—1'.5		.120	.160
	1'.5—3'.0		.072	.108
	3'.0—5'.0		.053	.108
1627	"	Poor	.224	.330
			.120	.138
			.087	.096
			.094	.098
1626	"	No	.529	.640
			.424	.440
			.135	.172
			.085	.120

The impregnation of this series is sodium carbonate, black alkali, other salts being present in traces only.

In group, 1628, the best growth, the concentration of alkali in the first 6 inches amounts to .135 per cent, which somewhat exceeds the usually accepted limit of tolerance for farm crops in general. It would seem, therefore, that onions might be classed with those crops which are more or less alkali resistant.

The concentration, as in the other groups of the series, diminishes with depth of sampling, evidently a characteristic of areas impregnated with black alkali.

Group 1627, representing the poor and distressed growth, probably marks the extreme limit of toxicity which this crop can bear. The amount in "A," .224 per cent is certainly much higher than crops in general could endure. In its lower members the alkali content corresponds very closely to that of group 1628, showing that it is the

concentration in the immediate surface soil that is the crucial factor in determining growth.

The percentages of sodium carbonate of group 1626, are not much higher than in 1627, yet they are sufficient to inhibit all growth. In this series we have an illustration of the fact that in the case of black alkali slight differences in the concentration are of very considerable significance. With white alkali the differences which mark the limit of toxicity are of much greater magnitude.

It is proposed to continue these studies for a number of seasons, obtaining further evidence as to the limits of tolerance for various farm crops, and at the same time ascertaining to what extent and in what manner the distribution of alkali is affected by irrigation with and without drainage. The work here recorded is to be regarded as merely the first step towards the establishment of standards for Canadian conditions.

THE DIVISION OF HORTICULTURE

DUSTING FRUIT TREES FOR INSECTS AND DISEASE

BY W. SAXBY BLAIR, SUPERINTENDENT, ANNAPOLIS AND CORNWALLIS VALLEYS
EXPERIMENT STATIONS

WE have been conducting experiments with the fine sulphur powder combined with dry arsenate of lead, the former to control apple scab, the latter insects, and comparing it with the regular lime-sulphur-arsenate liquid spray, which is the one generally used for the control of this disease and insects.

The dust spray is applied with a power-blowing machine, which throws out a cloud of dust. This envelops the whole tree, settling on the leaves as a fine dust coating, thus giving the necessary protection by preventing the germination of apple scab spores, and killing any insects which feed on the parts dusted. The powder is very fine and sticks readily to the leaf. There does not appear to be any necessity to apply the dust when the foliage is damp. It seems, however, that a heavy rain immediately following an application of dust will wash considerably more of it off than had it remained on the foliage one night, as the atmospheric night moisture tends to set the dust particles into the leaf, and the coating gives the necessary protection for as long a period as do the liquid sprays applied.

It will be readily seen, therefore, that if the dusting is properly done there seems no good reason why the dusting would not be as effective as spraying. Experiments conducted at this Station would show this to be the case. There may, however, be some conditions not encountered during the two years these experiments have been conducted, which would change our views on this matter.

The matter of dusting versus spraying, therefore, as a practical orchard operation, resolves itself into a question of application; the cost of equipment necessary to do a

thorough job, the cost of materials, cost of application, and the skill of the operator in doing the work.

RETAIN POWER-SPRAYING OUTFITS

We think it would be unwise for orchardists generally to do away with their power-spraying outfits and invest in dusting machines, although this may be advisable in some cases. The cost of materials will be much more per acre, as there is more waste in doing a good job with dust than with the sprays. The extra cost of materials will be offset by the lessened cost of application of the dust, which can be applied very much more rapidly, in fact as fast as a team can walk between the trees. The skill of the operator is a big factor, and good judgment, and rapid handling of the blowing tube, are necessary if a good distribution of the dust is to be made. There is not the wet foliage to guide one, as is the case when spraying, as the orchard is enveloped in a cloud of dust, and portions of the air may contain many times the number of dust particles that other portions do.

Difficulty is always experienced in getting a thorough job done at the top of tall trees with the liquid sprays. It has been noticed that such trees dusted have in general a better control of scab at the top than do the sprayed trees. This, however, is a matter for the operator to correct, because tall trees can be sprayed so that scab is controlled as well at the top as at the bottom of the tree.

It has been said that foliage injury, which is quite common on all sprayed trees, will not occur on dusted trees. This is not the case, as foliage injury may result from a dust application. It is not so likely to happen, however, and, generally speaking, there is less foliage injury where the trees are

dusted. The injury results from the arsenic in the dust, and the amount is evidently determined by the percentage of arsenic in the dust, and the period during which the foliage may be moist following the application.

Time is a big factor during the rush of orchard and farm spring work, and even were the results such that perfect control of apple scab is not possible as with the spray, it may yet be more profitable to dust, owing to being able to give time to

other necessary work. It is pretty nearly a personal question with the grower as to whether he can dust more profitably than spray. Certainly, though, dusting so far has in our tests, covering two years, given a satisfactory scab control.

TESTS IN 1918

Tests conducted at this Station, in a mature orchard of Gravenstein apple, during the season 1918, gave results as tabulated below:

	Per cent scab				Per cent insect injury
	Bad	Medium	Slight	Total	
Lime Sulphur	07	0	96	1.03	.5
Dust	1	4	6 6	7 01	8
Check	3 4	6 2	53 1	62 7	2.0

No foliage injury was apparent on any of the trees.

The amount of material used, of material and labour was as time required to apply it, and cost follows:—

	<i>Material</i>	<i>Dust</i>	<i>Spray</i>
Amount used per tree one application.		2 86 lb	6 82 gals.
“ four applications		11 44 “	27 28 “
“ acre of 40 trees one application		114 4 “	272 8 “
“ “ 40 trees four applications.		457 6 “	1091.2 “

Time

Time required per tree one application81 min	5 min
“ four applications	3 24 “	20 “
“ acres of 40 trees one application.	32 40 “	3 hrs. 20 “
“ “ 40 trees four applications.	2 hrs. 9 6 “	13 “ 20 “

Cost of Material

Cost of material per tree one application.	\$ 0 3003	\$ 0 0716
“ four applications	1 20	0 2864
“ acre of 40 trees one application.	12 01	2 86
“ “ of 40 trees four applications.	48.04	11.44

Cost of Application

Cost of application per acre of 40 trees one application.	\$ 0.486	\$ 3 00
“ 40 trees four applications.	1 94	12 00

It will be seen that the four applications per acre of 40 trees cost as follows:—

	Dust	Spray
Cost of material	\$48 04	\$11 44
Cost of application.....	1 94	12 00
	<u>\$49 98</u>	<u>\$23 44</u>

From the above it will be seen that the cost per acre was \$26.55 more where the trees were dusted than where sprayed.

The lime sulphur used was made by diluting 2½ gallons of the commercial concentrated lime sulphur to make 100 gallons, and to this was added 2½ pounds of arsenate of

lime to 100 gallons, costing \$1.05 per 100 gallons, or 1.05 cents per gallon. The lime sulphur concentrate cost 20 cents per gallon and the arsenate of lime 22 cents per pound. The dust was that made by the Niagara Spray Company contained 90 per cent fine sulphur and 10 per cent poison, costing \$10.50 per hundred pounds or 10½c. per pound. The time of team and one man were charged at the rate of 60 cents per hour, and one man at 30 cents per hour, or a cost of 90 cents per hour for team and labour. The trees were sprayed and dusted on May 20th, June 5th, June 20th, and July 6th.

THE HEALTH OF ANIMALS BRANCH

LIVE STOCK IMPORTATION RESUMED.

THE prohibition placed on the importation of cattle and other ruminants into Canada from the United Kingdom as the result of an outbreak of Foot-and-Mouth disease, announced in the November number of The Agricultural Gazette, has been removed.

No further outbreaks of the disease having been reported in the United Kingdom since the 9th of October, importations of cattle, sheep, and other ruminants and swine, may be resumed on and after the first of January, 1919.

PROSECUTION FOR VIOLATING QUARANTINE ORDER

A rancher in Alberta has been prosecuted and fined the sum of \$100 and costs for removing cattle from quarantined premises in the Big Valley district. The cattle owned by this man were quarantined for mange, with directions to be

treated under the supervision of an officer of the Health of Animals Branch. The rancher in question failed to treat his animals, and also permitted them to run at large and come in contact with other cattle.

THE ENTOMOLOGICAL BRANCH

THE HISTORY OF THE CODLING MOTH IN BRITISH COLUMBIA

BY R. C. TREHERNE, DOMINION ENTOMOLOGICAL LABORATORY, VERNON, B.C.

IN presenting the history of the Codling Moth in the Province of British Columbia, I do so with a feeling of obligation to Thomas Cunningham, former Provincial Inspector of Fruit Pests, and his assistant, W. H. Lyne; to R. M. Winslow, former Provincial Horticulturist and his successor M. S. Middleton and to their field staffs of district horticulturists, who have allowed me access to unpublished records and who have given me verbal information respecting the various outbreaks in the years gone by.

The Dominion Entomological Branch has only been actively associated with the Codling Moth situation in the Province of British Columbia since 1916. During 1916, 1917 and 1918, life-history investigations have been conducted by the Dominion officer and advice has been given to the Provincial horticultural field officers, during these years, in order to enable the eradication and control measures that were instituted to be carried on to the best advantage. I take credit only in having conducted the life-history investigations and in compiling the record submitted herewith. The field work against this destructive insect, at all times, has been strictly in the hands of the Provincial officers to whom all credit is due for the position British Columbia is in to-day in regard to relative freedom from Codling Moth infestation.

The history of the Codling Moth in British Columbia may be viewed from two separate standpoints: To students of entomology the record will disclose interesting results of eradication methods against incipient and prolonged outbreaks; to the fruitgrowers of the province the record will show what work has been accomplished on their behalf and

the danger that lies ahead from present infestations.

By way of introduction it will only be necessary to review the status of the fruitgrowing industry of British Columbia. In 1890, the census showed 6,000 acres of fruit; in 1900, 8,000 acres; in 1910 the census showed 33,606 acres; in 1913, 38,196 acres; to-day there are approximately 40,000 acres of fruit which are largely composed of apples. The apple crop of 1917 was 2,959 carloads with approximately the same for 1918.

THE VARIOUS OUTBREAKS

1. *The Victoria Outbreak*—The Codling Moth was first recorded in British Columbia in the vicinity of Victoria. The actual year in which larvæ were first discovered is in doubt, but it occurred at some time between 1900 and 1905. The close resemblance of the larva of the Codling Moth to the larva of the Lesser Apple Worm (*Laspeyresia prunivora*) and the similarity of attack, clouded the issue at this time, coupled with a certain hesitancy on the part of Government officials to acknowledge its presence. The introduction of the moth on this occasion was believed to have been caused by the introduction of infested pears from California. This belief is supported by the fact that the first determined larvæ were found in orchards adjoining a picnic ground and by the fact that infested Californian pears were being received at that time on the market of Victoria. In 1906 and 1907 no remedial measures were undertaken but in the latter year the moth had increased to such an extent that remedial measures had to be undertaken. In 1908, 164 orchards were found to be infested and 3,140 sacks of infested fruit were

destroyed. Compensation was allowed certain growers in the locality inasmuch as some fruit was destroyed which apparently was not infested. In certain orchards the infestation was as high as 40 per cent. It may be remarked that the seasons of 1907 and 1908 were usually warm both in spring and summer.

In 1909, following a careful inspection of the trees in the infested area, 7,610 larvæ were captured. In 1910, the first gasoline power spraying machines used in the pro-

in 1915. In 1916, 1917 and 1918 no work under Government control took place.

It is believed that the Codling Moth still exists in the Victoria district, but the possibility of it becoming a serious orchard pest is not considered very great unless the district is again visited by a series of abnormally warm seasons.

2. *The Kamloops Outbreak*—Larvæ were discovered in the summer of 1905 within the city limits of Kamloops, but there is little doubt that



CAGE USED NEAR VERNON, B. C., FOR STUDYING LIFE-HISTORY OF THE CODLING MOTH
(ORIGINAL)

vince, were operated in the Victoria Codling Moth area, a total of 12,931 trees being treated this year. In addition, 4,162 trees were sprayed by hand machines.

In 1911, inspection work during the year, revealed the presence of 7,000 larvæ, 77 orchards being involved. In 1912, 1,350 larvæ were taken in 50 orchards. In 1913, 432 larvæ were taken, and in 1914, 239 larvæ from 9 different properties. In 1914, an increase in the area of infestation took place, resulting in 291 larvæ being taken in 21 orchards

the infestation was present for some years previous. As in the case of the Victoria report the identity of the Codling Moth was confused with the Lesser Apple Worm. The introduction was believed to have been made through the medium of apples imported from Ontario. This outbreak proved an exceedingly difficult one to handle owing to its being located in city lots involving many separate owners, and on rented land. The summer of 1906 was, therefore, practically spent in demonstrating, pruning and spraying, and deter-

mining the limits of the outbreak. In 1907, the same work continued, 2,296 trees being sprayed. In 1908, the infestation was reported as 1 per cent and confined strictly within the city limits. In 1909, spraying and inspection continued. In 1910, evidently owing to the difficulty of dealing with the outbreak which apparently had been reduced to very small limits, the entire crop of apples was picked green upon the trees in July and August and destroyed. Remuneration was allowed to cover individual losses in apples. In 1911 and 1912 no larvæ were found. In 1913, however, an examination in late summer revealed the presence of a few larvæ and some empty cocoons. In 1914, therefore, the campaign again continued with a single power outfit at work, and a later inspection resulted in 12 larvæ being found. In 1915, in order to deal with a very tantalizing situation pressure was brought to bear which resulted in many worthless trees being cut down and the remainder severely pruned. Two sprayings, with hand and fruit inspections followed in an effort to cause complete eradication. The Government efforts were evidently successful because no larvæ have been taken in 1916, 1917 or 1918.

3. *The Kaslo Outbreak*—The moth was bred from apples grown at Kaslo in 1905. According to the reports of Dr. J. Fletcher, former Dominion Entomologist, this record was the first of its kind for the province, but in the light of later information there is no doubt that the outbreaks at Victoria and Kamloops preceded it. In 1906, moths were again bred from local grown apples and remedial measures instituted. These measures were either so successful, or the moth found conditions unsuitable to its growth and development, that no further reports of infestation have been received.

4. *The Armstrong Outbreak*—Early in the summer of 1912, twenty larvæ were taken in apples at Armstrong. Immediate inspection was under-

taken, resulting in 20 trees being found infested. The introduction occurred presumably through the medium of packing cases from some Oregon nursery. The entire crop on these 20 trees was bought in bulk, green upon the trees, placed in sacks and boiled.

This method should have been sufficient but in order to obviate any possibility of further outbreak the area was thoroughly sprayed in 1913 and an inspection of fruit followed. No larvæ were taken in 1913 or in any succeeding year.

5. *The Rutland Outbreak*—About 100 larvæ were taken in fruit at Rutland in 1912. Immediate inspection resulted in an area one mile square being found infested. Strict quarantine methods were instituted and all fruit handled under Government guidance. In 1913, two power spray outfits were placed at work, and inspection of hand and fruit followed, resulting in no larvæ being taken this year or in any year succeeding. There was apparently no doubt but that this outbreak originated from infested fruit in settlers' effects from Ontario, the empty cocoons being found.

6. *The First Kelowna Outbreak*—On August 19, 1913, an infestation covering 5,000 trees was discovered within the city limits of Kelowna. The campaign in this year resulted in from 75-100 larvæ being taken. The moth was probably introduced through the medium of infested railway cars. In 1914, three thorough sprayings were given the infested area with four power machines in operation. At the close of the year, 12 larvæ had been captured. In 1915, under similar quarantine measures, 3 larvæ were taken. In 1916, following the same procedure as in the two previous years, only one suspicious example of infested fruit was reported, the cause of the injury not being discovered. In 1917 and 1918 no further sign of the moth was revealed.

7. *The Second Kelowna Outbreak—*

A second outbreak, of a separate origin to the first, but probably from a similar source, occurred in Kelowna in 1915. The trees involved were sprayed, banded and inspected and only 14 larvæ were taken this year. No further report of the presence of larvæ was received in 1916, 1917, or 1918.

8. *The Okanagan Landing Outbreak*

—In September, 1915, larvæ were noticed in some fruit in orchards at Okanagan Landing. Close inspection revealed the fact that five properties were involved, covering approximately 80 acres, and 5,000 larvæ were collected. No actual accurate larval counts were made, hence this figure is approximate. There was little doubt that the infestation had become established a few years previous, and had started from larvæ swept from railway cars at the Landing.

In 1916, quarantine measures were adopted. No actual larval record was kept in this year, but the belief of the inspectors was that fully 3,000 apples were condemned as "wormy." In 1917, the regular quarantine and eradication methods with eight band inspections were again adopted resulting in 550 worms being taken by the end of the year. In 1918, owing to the difficulties of properly handling the outbreak, the entire crop of 35 acres was bought and pulled off the trees during June, July and August. Band and fruit inspections followed resulting in 112 larvæ being taken. The last larva was found in the middle of August, no more being taken in two later tree-to-tree band inspections. Unfortunately, however, the flight of second generation moths in August caused a re-infestation in orchards in the vicinity which, either had never before been infested, or which had been declared free from infestation for two years. These orchards, now infested, are located at least half a mile from any orchard attacked in the spring. At the close of the 1918 season in the entire

Okanagan Landing district 369 larvæ have been taken over an area of about 109 acres.

9. *The Westbank Outbreak*—In August, 1915, a severe infestation was discovered at Westbank involving 24 different properties. Autumn inspection of fruit resulted in approximately 5,000 apples, doubtless attacked by the larvæ, being destroyed. There is little question that a fair proportion of these apples were, in reality, attacked by the Lesser Apple Worm. As in the case of the Okanagan Landing outbreak of this year, the lateness of the season and the need for rapid work precluded any opportunity of making exact larval counts. In 1916, the usual spray applications followed by band and fruit inspections, yielded in the neighbourhood of 500 worms. In 1917, following the same procedure, about 50 larvæ were collected and in this year, 1918, until the close of the year, after similar operations to 1916 and 1917, only 6 larvæ and 2 empty cocoons were taken. The last larvæ were taken on September 6th, and nothing in two later band inspections. The remarkable feature of this outbreak lies in the fact that the few larvæ taken in 1917 and 1918 were captured in fairly widely separated areas, covering an area nearly equal to the original sphere of infestation. In this outbreak approximately 200 acres were involved. In 1906, 7,788 trees were banded, and 8,000 in 1917. These bands were inspected 5 times between July and October.

It may be remarked that some larvæ, approximately 100, were discovered at Gellatly's in 1916, fully one mile from the nearest infested orchards at Westbank. Whether this infestation was due to the flight of moths, or to careless handling of fruit boxes, it is impossible to say, the former method of dispersal being considered feasible under the conditions attending the outbreak.

10. *The Eburne Outbreak*—Two larvæ and twenty attacked but abandoned apples were found at Eburne in

1915. Examination of the area, in 1916, revealed no further sign of infestation, though no remedial measures were definitely undertaken in this year. The prevailing temperatures and high humidity of the locality doubtless reacted against the successful propagation of the moth.

11. Two or three larvæ were reported from Kaleden in 1916. It is possible that confusion has arisen in this case with the larvæ of the Lesser Apple Worm, for no further sign of the Codling Moth has since occurred.

12. *The Vernon Outbreak*—During the winter of 1917-1918 a rumour was received that Codling Moth larvæ had been received in the packing houses from Vernon orchards during the 1917 apple packing season. Careful inspection during March, 1918, revealed the presence of 4 larvæ in the bark of some old apple trees in the City of Vernon. In June, all the developing fruit on 41 old trees in the vicinity was removed, and on 9 small trees, left to act as traps, the fruit was picked during the first week of September. Altogether during the year, (1918) 17 forms of Codling Moth were taken in Vernon.

13. *The Walhachin Outbreak*—During the autumn of 1916, larvæ were found in orchards at Walhachin. An area covering 60 acres was found liable to be infested. Spraying, band and fruit inspection work was undertaken during 1917 and 1918. In 1917, about 100 larvæ were taken; in 1918 no sign of larvæ was indicated, following four band inspections and the examination of the fruit output.

THE PRESENT SITUATION

At the close of the year 1918, Codling Moth larvæ in limited but unknown quantities are believed to exist in the city of Vernon, and in the orchards in the vicinity of Okanagan Landing, covering an area of 109 acres and involving 200 additional acres in the vicinity. The Walhachin and Westbank outbreaks

are apparently in a most healthy condition. To be optimistic it might be said that the orchards at the last two points may be considered free from infestation. For safety's sake, however, it is well to be guarded for the reason that precautionary measures are doubtless still needed. At Victoria, the moth is still believed to exist, but unless an unusual series of seasons approach, this outbreak is not viewed with great alarm. Kamloops, Kaslo, Armstrong, Rutland, Kelowna, Eburne and Kaleden are all supposed to be free from infestation, having been clear for from 2 to 12 years.

In order to express the history of the Codling Moth in another way, it may be said that since 1905, at least 12 and probably 13 distinct outbreaks have occurred in the province, at widely separated points. A marked increase in the numbers of outbreaks occurred after the year 1912, coincident with a noted rise in the fruit yielding capacity of British Columbia orchards. Altogether, since 1908 at least 40,000 Codling Moth larvæ have been collected and destroyed by hand labour, and at least 50,000 apple trees have, in this time, been under careful surveillance and inspection. In the year 1912, approximately 470 larvæ were taken in the province; in 1913, 542 larvæ; in 1914, 263 larvæ; in 1915, 10,330 larvæ; in 1916, 3,553 larvæ; in 1917, 625 larvæ, and in 1918, 394 larvæ.

In the year 1912, operations, tending towards the eradication of the Codling Moth were being carried on at 4 localities; in 1913, at 5 localities; in 1914 at 3 localities; in 1915 at 7 localities; in 1916 at 7 localities; in 1917 at 3 localities; in 1918 at 3 localities.

GENERAL ORCHARD OPERATIONS IN INFESTED AREAS

The following operations are undertaken wherever an outbreak is reported:

- (1) All trees are banded.
- (2) Periodical inspections are given the bands and main tree trunks:
 - (a) In May, for overwintering larvæ.
 - (b) In early July, for first generation of full grown larvæ.
 - (c) In late July.
 - (d) In mid-August (optional, according to seasonal development).
 - (e) In September for second generation larvæ.
 - (f) In October.
- (3) Windfalls from July onwards are disposed of by boiling and burying.
- (4) Two or three spray applications commencing with the calyx spray are given.
- (5) All root sucker growth is removed from the trees.
- (6) All loose bark and dead wood is removed.

In certain circumstances with closely confined infested areas, where labour difficulties arise, or spraying operations are not feasible, resource is had to the direct removal of the fruit by hand immediately after blossoming. This usually agrees with the period of year in a fruit grown district when labour is more available.

FRUIT DISPOSAL IN INFESTED AREA

The following procedure is adopted:

- (1) An order for the formation of a Codling Moth quarantine area is passed under the authority

of the Agricultural Associations Act.

- (2) All tree fruit is inspected before shipment.
- (3) Inspectors are notified when shipments are intended.
- (4) All fruit is packed in a packing house in the infested area, no fruit being allowed to be handled in a house through which fruit from a non-infested area is passed.
- (5) All orchard boxes used in quarantined areas must remain in such areas unless passed by an inspector.
- (6) All fruit in infested areas is loaded into railway cars by the most direct route and no such fruit is allowed to be sold in the province or for export from Canada.
- (7) Loose or unpacked fruit must not be moved from a quarantined area without permission from an inspector, and no fruit must be stored in cellars or houses without proper inspection.
- (8) Cull fruits must be at once made into cider, apple sauce, or be destroyed.
- (9) Railway companies are requested to dispose of the sweepings from fruit cars before loading by burning.
- (10) Refrigerator cars are inspected at as few points as possible, and infested cars are kept closed, iced as soon as possible, loaded locally, or are rejected.

THE LIVE STOCK BRANCH

PROGRESSIVE ACTIVITIES

LIVE Stock and Live Stock products are, and will be, in great demand. Any doubts that have arisen may be dispelled by careful study of normal and, in addition, the requirements from America due to war losses.

The Canadian product must in the near future be firmly established in the British market; competition from other countries can be met

elimination of the scrub sire, and to secure proper representation in Great Britain, in order that Canadian Live Stock interests will be carefully guarded and energetically kept to the fore.

ASSISTANCE TO CATTLE BREEDING

Pure-bred bulls are loaned to organized societies in newly settled districts and backward sections in some of the older provinces where farmers are unable to purchase pure-bred sires for themselves. Up to date, 2,104 farmers have been supplied.

CARLOT AND FREE FREIGHT POLICIES

The reasonable travelling expenses have been paid for any farmer, or authorized agent, of a number of farmers in any section of Canada who purchased one or more carloads of breeding stock in any part of the country, or of feeding and stocker cattle at stockyards in Western Canada, provided such stock was not purchased for speculative purposes.

To further protect breeding females under the free freight policy, the Live Stock Branch assumes 75% and the railways 25% of the ordinary freight charges on shipments of useful heifers, young ewes, and young sows offered for sale on the open markets at central stockyards, to country points, provided the stock was not purchased for speculative purposes.

Up to November 30, 1918, 93,021 head have been shipped under these policies.

Feed was scarce in many western districts during the past season. Freights were assumed to encourage transfer.



W. R. REEK, B.S.A., ASSISTANT LIVE STOCK COMMISSIONER

successfully by quality in the product only. The demand for quality will become more insistent as the supply comes nearer to meeting the requirements.

The rearing of suitable animals by every farmer according to opportunity is one problem, the proper and efficient marketing of the live stock products in an equally difficult and important matter.

Steps have already been taken to inform the public of the situation, to ensure a higher quality by the

RECORD OF PERFORMANCE

Sixteen men are constantly employed making regular tests for breeders of pure-bred animals. This activity is a means only whereby the high producing cow can be properly recognized and authentic records kept as a guide regarding their progeny.

POULTRY

The standardization of eggs, the co-operative collection and marketing intelligence re markets and the stock improvement activities, have been prosecuted so vigorously that a strong foundation has been laid upon which we can build for the future with every expectation of success.

Co-operative marketing developed in many parts reaching its highest state in Prince Edward Island, and, coupled with this movement, came a demand for intelligence re markets. An intelligence system was devised, and a report is compiled and mailed once every week. Improvement of flocks followed in the wake due to poor quality of eggs and poultry received from many circles, for which undersized and mongrel birds were accountable. Inspection and flock culling was instituted, and the avenue for development opened is very large, and one which, if properly followed, up, will quickly regenerate the poultry of Canada.

Standardization of eggs as now administered under the "Live Stock and Live Stock Products Act" affects the entire Canadian Poultry industry, either directly or indirectly. Inspection of interprovincial and export trade will indirectly affect the local markets. This movement has established the superiority of Canadian eggs over ungraded products of competitors in the British markets, and also in our own cities. Quality is the paramount issue.

HORSE BREEDING

Assistance is now offered to clubs organized for the purpose of improve-

ment in the horses of any particular district; this movement was commenced in 1915, and now there are approximately 200 clubs with a very bright outlook for 1919. Actual results must be obtained before assistance is granted; co-operative enterprise is encouraged.

The loaning of stallions will be continued in outlying and needy districts where no pure-breds are standing for service.

SHEEP AND SWINE

The sheep industry has by war conditions been emphasized, and is now under serious consideration by many would-be sheepmen. The educational campaigns of this Division have been to the point, and no man who is only beginning need be without proper assistance. The grading of wool, placing or bonusing rams, community breeding, dipping and shearing, and the co-operative marketing of lambs have been undertaken. The placing of rams of some single breed is encouraging community breeding, and will undoubtedly lead to greater co-operative enterprise later. Community dipping and shearing are now definite enterprises supported by the Branch.

Over 4,000,000 pounds of Canadian wool was graded in 1918. This wool was sold on a quality basis and the producers were paid according to grade.

Sections where pure-bred rams are really required have been assisted through the formation of societies.

Pure-bred boars are placed with farmers under similar conditions.

FEEDS

The supply and distribution of concentrated foodstuffs was very seriously affected by war conditions; regularly the trade handled these commodities, but the uncertainty of supply and delivery caused considerable apprehension in the country; consequently, to meet the emergency a feed division was formed.

Since January 1, 1918, the following has been purchased and sold:

Purchases.

Sales.

Screenings..... 7,918 tons—110 bush.
Corn.....341,020 bush.
Oilcake (slab).....10,000 tons.
Oilcake (meal).....2,613 55 tons.
Bran..... 1,978 5 tons.
Middlings.....450 tons.

6,716 tons—260 lbs.
235,016 bush.—341 lbs.
7,399 tons—630 lb.
2,413 tons—50 lb.
1,978.5 tons.
450 tons.

MARKETS BRANCH

Greater knowledge on the part of the producer *re* marketing has become a necessity. Few farmers only are able to visit the large live stock markets. Men are placed upon the large markets to study conditions, to report upon the stock passing through, to keep in touch with drovers, commission men, packers, railway officials, and any others who touch the live stock interests. Under the Live Stock Products Act stock yards are governed by regulation, and it is the desire that every accommodation be given the people to market intelligently and satisfactorily.

The class of stock reaching any market is indicative of the development of the industry in any locality; thus the market becomes an unmistakable indicator and one which will readily register improvement.

Yearly the markets are becoming more valuable for the transfer of stockers and feeders from districts short of feed to sections with sufficient; the farmer can more easily secure car-lots in this way than by driving over the country. The Branch acts as a medium in such cases.

Weekly a markets report is published showing the receipts, grading, and prices at the principal centres; this material is made use of by the agricultural press and many others.

Particular attention is given to shipments coming from co-operative organizations.

EXHIBITS

Educational advertising by various

means is a necessity, and it may be done through the press, by bulletins, by moving pictures, or by exhibits at exhibitions which are permanent organizations. Through the latter millions of people may be reached and attracted; the impressions made by a carefully prepared exhibit demonstrating certain principles will not be quickly forgotten. The Branch has a very competent staff who are able to properly prepare exhibits with the idea of leaving definite impressions. This work is very important, and is carried on under the direct supervision of those immediately in charge of the work in the Branch, and must reach all the people possible through the medium of the fall exhibitions.

SPECIAL CAMPAIGNS

Conferences to which the Provincial Departments of Agriculture and the Live Stock Interests sent representatives were called to devise ways and means to meet the demands from Europe during the war. Poultry and hog-raising were particularly featured. The Branch prepared to assist, and did assist, wherever possible in the manner decided as a result of the conferences.

The war has been won. New problems are now upon us. The securing and holding of high class markets for our products must be undertaken immediately; this is a national question, but one which can be solved successfully by the hearty co-operation, in so far as possible, of every individual interested in the welfare of the country at large and in live stock particularly.

THE SEED BRANCH

SEED OATS FOR THE PRAIRIE PROVINCES

TO ensure an adequate supply of seed oats for the Prairie Provinces for the spring of 1919, on the recommendation of the Minister of Agriculture, the following Order in Council was passed under date of Nov. 28, 1918:—

Whereas the Order in Council dated the 2nd day of November, 1918 (P.C. No. 2674), has become inoperative by reason of the fact that the Board of Grain Supervisors has rescinded its Order No. 84 of date the 10th October, 1918;

And whereas it is essential to ensure an adequate supply of seed oats for the Prairie Provinces for the spring of 1919:

Therefore, His Excellency the Governor General in Council, on the recommendation of the Minister of Agriculture, is pleased to authorize and doth hereby authorize the Dominion Government Seed Purchasing Commission to requisition oats on the following conditions:—

1. The said Commission will accept oats suitable for seed at the Canadian Government terminal elevators at Moosejaw, Saskatoon, and Calgary, and shipped from any point west of Winnipeg.

2. The said Commission will pay for oats for milling and for seed and accept it as such at the above-named points at the following prices, basis Fort William freights and Winnipeg Grain Exchange prices for the day:—

For Manitoba oats:—

Commercial grades, no premium;
No. 2 seed, 3 cents per bushel premium;
No. 1 seed, 7 cents per bushel premium.

For Saskatchewan oats:—

Commercial grades, 3 cents per bushel premium;
No. 2 seed, 6 cents per bushel premium;
No. 1 seed, 10 cents per bushel premium.

For Alberta oats:—

Commercial grades, 8 cents per bushel premium;
No. 2 seed, 11 cents per bushel premium;

No. 1 seed, 15 cents per bushel premium; provided always that the said Commission shall not be under obligation to accept delivery of any oats which are inferior to No. 2 seed and contain more than 100 wild oats to the pound.

3. The said Commission is authorized to send seed inspectors into any elevator, warehouse, or mill in the provinces of Manitoba, Saskatchewan, and Alberta, for the purpose of examining oats held in or at such elevator, warehouse, or mill that may be suitable for seed or milling; if the inspectors find in or at any such elevator, warehouse, or mill or in cars on track or in cars loaded over loading platforms any oats suitable for seed or milling such oats become thereby the property of the Dominion Government Seed Purchasing Commission, and such oats are subject to immediate shipment to the order of the Dominion Government Seed Purchasing Commission when cars are obtained. For such oats the said Commission will pay in accordance with the values named in clause two hereof, including the premiums named for the respective qualities of oats in each of the three provinces of Manitoba, Saskatchewan, and Alberta, the price to be determined on date of inspection.

It is well known that fruit crops deplete the land much more than annual crops of grain. Professor I. P. Roberts estimates that five bushels of apples remove about eleven pounds of nitrogen, one pound of phosphoric acid, and sixteen pounds of potash, and that the leaves of a tree large enough to produce the apples would contain ten pounds of nitrogen, three pounds of phosphoric acid, and ten pounds of potash, making a total depletion of the soil by the tree in fruit and leaves in one year, twenty-one pounds of nitrogen, three pounds of phosphoric acid, and twenty-six pounds of potash.

PART II

Provincial Departments of Agriculture

THE REST ROOM

In the march of progress for better agriculture, rural women are seeking more of the comforts and conveniences that should be theirs. Men have never lacked meeting places on their visits to town, but women have had to do their shopping, and transact any other business they might have, and return home, almost without pause. The rest room has supplied the long-experienced deficiency. Here it is possible for women, often burdened with the attention of accompanying children, to find ease and attention. It will be seen by the following articles, contributed from different sections of Canada, that the movement to provide this accommodation has made rapid progress in the last five or six years, and is continually growing.

NEW BRUNSWICK

BY MISS HAZEL MCCAIN, SUPERVISOR OF WOMEN'S INSTITUTES

REST rooms have not been established in connection with the Women's Institutes in this province. I shall endeavour to describe the sort of rest room that would serve the purpose for women who come into town to do business.

The rest room should be in the same building as the officers of the local Institute or in one close at hand. This arrangement would permit some one of the staff to have a general supervision of the room. The equipment should be simple, substantial, and chosen with good taste, keeping in mind the purpose for which it is intended. A sufficient number of comfortable chairs with a couple of large library tables and book cases should be provided. Magazines and books, with a few good pictures, would assist in making the room a

real rest room. If possible the floors should be hard wood, with a few good rugs, or, if of soft wood, they should be covered with linoleum or rubber matting.

The rest room may be a gift outright by the women's institute for the benefit of its members, or it might be better for the organization as such to furnish part of the support, leaving the guests an opportunity of supplying their share. If this latter plan were adopted, the organization might pay the first cost of the room and its equipment, while the guests would pay the necessary subscription fee for its upkeep, which would include light, heat, literature, and janitor service. If such a room were sufficiently patronized a cafeteria established in connection with it would probably prove advantageous.

ONTARIO

BY MRS JAMES LAURIE, SEC. THEDFORD WOMEN'S INSTITUTE.

THEDFORD Rest Room was opened March, 1913, by the Women's Institute. This room, which is 20' x 30', has a lavatory 12' x 8' in connection, also a woodshed and storeroom.

It is furnished with couches, rocking chairs, organ, table, etc., and always supplied with good literature, writing material, and such like.

It is opened to the public every

Saturday, when some of the members of the Women's Institute are there to welcome the people and spend a pleasant afternoon and evening.

It is such a success, and everybody enjoyed it so well, that they added a kitchen 12' x 12', well equipped, which is very convenient, as the room is used for social evenings, teas, and meetings. The girls are always willing to supply music and make the afternoon pleasant for those using the room.

When the war broke out, there were more tables and sewing machines put in, and the room opened every Thursday "Working for the soldiers".

To raise money 10c. teas were

held every Saturday in the rest room, three ladies from the country and three from the town providing the refreshments. Since the shortage of food penny bags have been placed in the homes and are collected once a month by the little girls and taken to the rest room and given to the Red Cross secretary.

The remark is often made, "I don't know what we would do without our rest room". It costs in the neighbourhood of \$80 a year to keep it up. Once a year, the members are asked if they would like to give it up, but none would care to part with it.

MANITOBA

NOWHERE is the value of the rest room better recognized than in the Prairie Provinces. In scattered communities women have to travel in frequent instances a long way to do their shopping. They, therefore, badly need some centre at which they can pause and take the brief rest needed for recuperation. In bygone days the meeting place was usually the little local circulating library. While this place afforded scope for friendly chat, it gave little facilities for real rest, and, in fact, was rarely used for that purpose.

THE BEGINNING

In Manitoba the rest room as an institution has made considerable progress in recent years. As a matter of fact nine years ago such an institution was unknown. In 1910, far-seeing, philanthropical ladies of Virden recognized this great want. The matter was brought before the Home Economics Society of that town and a large room was rented for \$15 a month that was divided into two. Gifts came in from various members of the society and in very short order the place was equipped with furniture, pictures, sofas, magazines,

and daily papers. The Home Economics Society appointed a committee that took control of the details. Some grants from the town council and rural councils helped towards the financing, and, with the sale of refreshments, put the institution on a satisfactory financial footing. It is worth while quoting a paragraph from an account given by a lady prominent in the establishment of this rest room, showing not only the objects, but also the measure of accomplishment that has been achieved:

To-day this room is the community centre for the women of the district. Many bring their butter and eggs here, having previously arranged with the town women for sales. In the early days of our patriotic work we gave out thousands of articles, cut ready to make, and hundreds of pounds of yarn for socks from this room, and thus got the whole countryside interested in this work and in this room. Our women feel at home here, leave their wraps and their children, get a cup of tea if they wish, meet other women. There is always some one in the rest room. In winter the women heat foot warmers, wrap up the children, etc., and go home in comfort. Doctors say if there was a rest room in every town there would be fewer sick women.

GROWTH OF THE MOVEMENT

From this rest room in Virden upwards of two hundred similar

establishments have been created in different parts of the province, very largely, it should be remarked through the action of Home Economics Societies. In many cases the township councils have been induced to lend their influence, recognizing that the more attractive the locality is made, and the better facilities for visiting and shopping, the greater will be the upward progress of business. In Portage la Prairie for instance, the council requested the ladies to appoint a representative from each ward to meet with that body. These ladies were organized into a Board of Management, and now the council pays the bills, while the ladies manage the rest room and submit a report of their methods and proceedings. The council of Portage la Prairie is elected on a two-year plan and, as each new councillor is elected, he selects a lady from his ward to act on the Board and the lady thus selected retires with the councillor, being of course reappointed with his re-election. A matron who is regularly engaged serves a 10c., 15c. or 20c. lunch, and any profit derived therefrom is expended on the necessary equipment and in the purchasing of facilities for writing and reading. The council provides, furnishes, and keeps the room in repair, pays for light, heat, telephone, and coal oil for cooking purposes, and the matron's salary. There is a sitting room, sewing room, kitchen, and the matron has a bedroom for herself.

CAREFUL BUT PROGRESSIVE.

In other places than Portage la Prairie, the councils have not been so liberal-minded, but determined women have overcome the difficulties presented. At Youngstown, for example by holding a dance and with contributions made by farm women a small sum of money was raised, and in 1916 a lot was bought for \$165, half down. A building was planned that would cost \$350, but opposition arose to going into debt. At this juncture

the owner of a store offered accommodation free. This was at the time of the fall fair, and with considerable effort donations were secured of the necessary furniture and other equipment. After this a tag day was held, and ultimately, with picnics, box socials, and social evenings, \$300 was secured for the building. A live committee was appointed, and with the help of a generous hardware man a rest room came into being, 20' x 24', with a kitchen 10' x 10', and a bed room for the matron of the same size, the whole having cost \$1,250. Of this all but \$450 has been paid off, and it is expected the entire debt will be cancelled in the near future. The Red Cross and W.C.T.U. are given the use of the building for their monthly meetings free of charge.

What has been done at Portage la Prairie and Youngstown has been accomplished in various ways in other places. The women's section of the Grain Growers' Association has exercised considerable influence in establishing these rooms and in providing for their equipment and up-keep.

BRANDON'S MODEL ROOM

One of the most efficient rest rooms is that of Brandon, which has the advantage of a large surrounding tributary territory. The Brandon rest room was opened on April 13 and in July had 3,800 visitors. During the first five weeks that the room was opened the number of visitors reached 1,200. This rest room originated with the Women Grain Growers, who corresponded with the various women's clubs in the district and induced them to appoint representatives, who were organized into the Brandon Rest Room Board. Each municipal council was asked to name one of its members to represent it on the Rest Room Board. The Board thus formed adopted a resolution pointing out the necessity for a rest room that was submitted to the city council and to various rural municipalities. The result was that the five municipi-

palities bordering on Brandon gave grants of money aggregating \$625; merchants of the city subscribed \$600; the country women subscribed over \$300, and the city council

matron was engaged, and it is felt that the rest room at Brandon is filling a long felt want. While the expense of the room is rather over the \$75 originally figured on, it is



THE BRANDON, MAN., REST ROOM.

donated \$100. A refreshment booth at the Grain Growers' picnic, held on the Experimental Farm, cleared \$160, which was added to the fund. With the money thus obtained, a structure known as the old telephone building was rented and fitted up with the requisities to make the place comfortable and restful. A capable

felt that the necessary revenue to meet expenses will be forthcoming from the activities set in motion by the Board.

The foregoing is a fair representation of what is being done in Manitoba towards the establishment of havens of rest for tired women and their infants.

ALBERTA

BY MISS BESSIE McDERMAND, ASST. SUPERINTENDENT WOMENS' INSTITUTE

A FRIENDLY and comforting work has been accomplished by many Alberta Women's Institutes in establishing rest rooms. When the rest rooms were first started, the only object was to provide a clean and convenient place for the country shopper to rest, and

leave her small children. This conservative view point has changed absolutely. Now in many villages the rest room is really an ideal community home, where the women gather in the hope of meeting other friends and enjoying a social chat over their cup of tea. Not alone

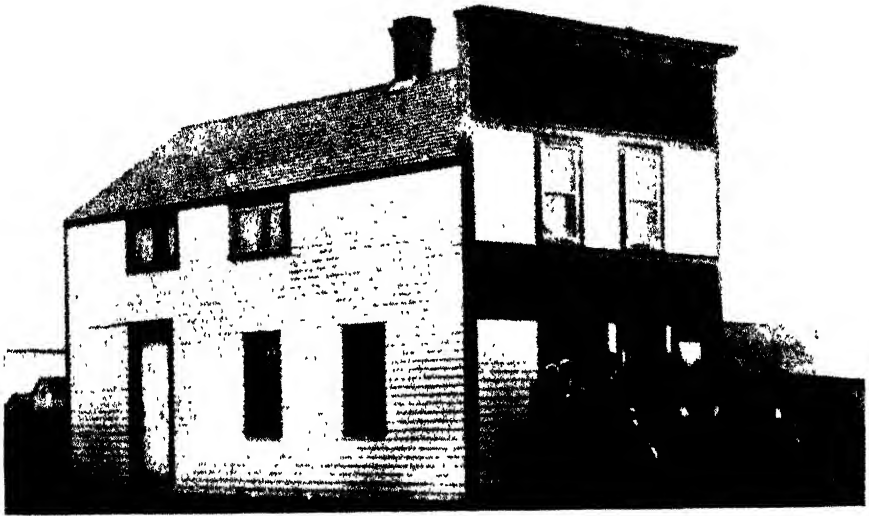
do the women monopolize the comforts of the community home, but the men also have a taste of the enjoyment it affords. Last week a report was received at the Superintendent's office that the Gem Women's Institute were going to give an "approved smoker" to their husbands at the rest room.

The rest room which was built at Taber a number of years ago has been the means of bringing the country and town women in touch with each other and has made them real friends; they have learned to co-operate successfully. The rest

Chatauqua was at Carmangay the Institute hired a woman at the rest room to care for the small children.

The Olds rest room has been made attractive to the high school girls, who drive in from the country and those who board in town. The rest room is well supplied with magazines and reading material and provides the comforts of a well furnished living-room, bringing them at least a taste of home environment.

Cereal rest room has been, and is, a great asset to the little town, as it has incidentally been the means of bringing a nurse of the Victorian



CARMANGAY (ALBERTA) REST ROOM

room is a thriving Saturday market every week, where the residents of the town secure fresh eggs, sweet country butter, and cream. In accomplishing true co-operation between country and town women this rest room is worthy of support.

The first rest room built in Alberta was constructed at Carmangay in 1913. It is used principally as a recreation centre by both the town and country people. Down-stairs there is one large room and a kitchenette, where many an appetizing lunch is prepared by hungry country folk after they have endured a long tiresome drive. This year when the

Order to that place. The rest room is a pretty little bungalow with four rooms. When the Institute applied for a nurse they decided to make it her residence. They also gave her another room to be used for patients whom she desired to have near at hand.

Youngstown Women's Institute has just completed a fine building to be used for a rest room. The building cost them \$1,500.00 and they have expended \$150.00 up to date on the furnishings; a number of things have also been donated to contribute to its comfort. To raise the money the Institute gave several

entertainments, canvassed for subscriptions, and obtained grants from the municipalities benefitted by it.

Round Hill Institute expects to build a rest room in the near future. The Institute is canvassing each member of the community for the

Room" sign as far north as Peace River, and as far south as Magrath. They may be used for band practices, co-operative market centres, homes for the sick, community recreation headquarters, hives of Red Cross industry; but these things are only



CEREAL (ALBERTA) REST ROOM

donation of a board, or the price of one to help defray the expenses of building.

At the present time there are twenty-seven Women's Institute rest rooms in Alberta, each one supplying the need of its locality. In nearly every case they are the headquarters of the Red Cross and Field Comforts work. The Institutes' rest rooms do not confine themselves to certain districts of the province, for one may see the "Women's Institute Rest

the by-products, they are essentially rest homes.

The following institutes have supported rest rooms:

Athabasca,	Carmangay,	Crossfield,
Claresholm,	Delbourne,	Golden Centre,
Huxley,	Hanna,	Killam,
Kinsella,	Magrath,	Munson,
Nightingale,	Provost,	Red Deer,
St. Albert,	Strathmore,	Youngstown,
Cereal,	Vulcan,	Olds,
Taber,	Sexsmith,	Innisfail,
Barons,	Entwistle,	Castor,
Rosebud,	Sibbald,	Stavely,
Peace River,	Carstairs,	Bow Island.

THE UNITED FARM WOMEN

BY MARY W. SPILLER, PROVINCIAL SECRETARY

WHAT is the value of a rest room in the nearest town or village to the farm women in the neighbouring communities? It would indeed be difficult to estimate, but I have not the slightest doubt that the members of the various local branches of the United Farm Women of Alberta, who have established rest rooms,

would testify to the fact that they more than repay them for the time and money which was spent in their establishment. The country woman, especially the woman who has young children, knows what it is to get them nicely dressed, all looking spick and span, ready for a drive of anywhere from six to fifteen miles, sometimes more, to the nearest town to

do her shopping. The day is hot, the roads are dusty, and when they arrive at their destination the children are all mussed up, and the mother feels tired, blown about and untidy; how nice it is to know that they can go straight to their rest room, have a wash and tidy up generally, rest a little while, and perhaps make a cup of tea, before they start out to do their shopping and to meet their friends.

VALUE OF THE REST ROOM

Even if one is lucky enough to own an auto, the rest room is none the less valuable, as even in an auto one gets pretty well blown about on a windy day, and, after battling with the elements for even a comparatively short distance, one appreciates being able to get one's hat straight once more and the stray ends of one's hair tidied up, while a refreshing cup of tea seldom comes amiss. It is also nice to have a place where one can meet one's friends and have a chat, instead of having to stand in the street, or in some store, and undoubtedly women will come to town much oftener if they know that when they have finished their shopping, they can go to a nice bright cheery room of their own, where they can sit and talk with others, or read a magazine, while waiting for their men folks to get through their business, which often takes up a considerable length of time, especially when parts of farm machinery are brought in to be repaired, or something of that sort. This usually means a long dreary interval spent sitting in a buggy, or auto, if there is no rest room, which detracts very considerably from any pleasure which the outing has for them.

USES OF THE ROOMS

The U.F.W.A. rest rooms have a variety of uses. In most places they are social centres, where meetings and entertainments are held. It is very much easier to get a good attendance

at a meeting when it is held in a bright comfortable room, where the members are at least sure of warmth in winter time. Dishes are kept on hand, and as a rule there is a small stove where a kettle can be boiled, so that a light lunch can be served with very little trouble, which is sure to be appreciated.

THE EQUIPMENT

The establishment of a rest room is not a very difficult problem. The members get together, decide on a room or hall, or possibly a vacant store in the nearest village, which can they rent for the purpose. This being done, the next thing to consider is the furnishing, which does not need to be at all elaborate. For an ideal rest room, I would suggest a couch, some chairs, including a rocker or two if possible, a table, some benches to be used when meetings are held, a few shelves to hold dishes and a small stove. The main thing is to make the room as attractive and comfortable as possible with the least possible expenditure. Wonders can be performed with empty boxes and some pretty inexpensive muslin. For instance, an empty apple or orange box can be transformed into a wash-stand, while another would make a dresser. A looking-glass, needless to say, is a most essential article, as are also a wash jug and basin. Paper towels cost very little, and are more sanitary than the ordinary kind. Bookshelves should also be put up, or two or three empty orange boxes might be put together draped with muslin and made to serve the purpose of holding a library. A nice linoleum or congoletum on the floor will of course add greatly to the attractiveness of the room, and muslin curtains on the windows should not be omitted. A few pictures will cost little; cheap prints or pictures taken from magazines and framed with passe partout can be used.

THE FINANCING

The furnishing of a rest room must of course necessarily depend on the funds, and very often has to be done by degrees, beginning in a small way and adding improvements as time goes on. Funds are raised in a variety of ways, the most popular being by means of dances, box socials, and other entertainments. In the majority of districts I think experience has shown that it is easier to raise money at dances and box socials than in any other way. Some of the women interested in establishing a rest room will doubtless be only too pleased to donate some of the smaller articles, such as the muslin curtains, pictures, muslin for drapery and things of that sort. If sufficient money can be raised to purchase an organ, it will of course prove an invaluable addition, and would I imagine amply repay the members of the society to which the room belonged, for the money spent on it, especially when entertainments are held. One of our older U.F.W.A. locals has recently purchased two baby carriages which are kept in their rest room for the use of members who have to bring young babies to town, and what a blessing it must surely be to a mother to be able to put baby in a carriage and wheel him round, instead of having to carry him in aching arms while she does her shopping.

THE CARE

Who shall look after the rest room is a matter which must of course be arranged according to local conditions. If possible, it is a good idea to arrange for some woman living in town to open it up for a few hours on two or three days each week; oftener if possible. She would also be responsible for keeping it clean and tidy, for which she would expect a small remuneration. If this cannot be arranged, each member should have a key, so that she could use it at any time she wished, and some arrangement could be made for someone to come in and tidy it up once or twice a week. The former suggestion is of course preferable, and if a woman cannot be found to undertake the work for such remuneration as the members feel they are able to afford, perhaps a school girl would be glad to do it in the afternoons, thus making a little pocket money for herself. Doubtless the women in the village would be glad to co-operate with the farm women in establishing a rest room, as it would be of mutual advantage, because there is no doubt that farm women would come to town more often if they had such a room to make use of, and consequently money would be spent locally that would otherwise go to the mail order houses.

BRITISH COLUMBIA

BY W. J. BONAVIA, SECRETARY, DEPARTMENT OF AGRICULTURE

THE women's institutes of British Columbia have in several places of the province opened and maintained "Rest Rooms" for the comfort of women coming into town to do shopping. These have been established, furnished, and supported by the institutes, and have been of great comfort to those using them; possibly, had not the great war taken all time, energy, and thought, this movement might have

developed into something larger, at least in the principal centres. At present all that is attempted is to have the rooms comfortable and kept clean.

Nelson W. I., had a rest room for a few years, but, on account of the cost of rental and upkeep charges, it had to be given up.

Oyster W.I., at Ladysmith maintained a rest room for some years. A number of the institutes within a

few miles of Victoria were in correspondence with women's organizations in the city to start a joint rest room, but nothing definite has been done.

Chilliwack W.I. has maintained a rest room for 8 years in one of the best business blocks of town. For the first few years the cost of rental and upkeep came to \$200.00, but now they only pay \$7.00 monthly. At first the merchants of the town gave from 25c. to 50c. each per month, towards the rental, the ladies collecting this; then the city and municipal councils each made a grant of \$25.00 per annum in place of this; but since the war this help has been discontinued.

Comfortable chairs for adults and children, a table to spread one's lunch, steam heat in winter, and sanitary conveniences are given.

A MODEL REST ROOM

In the larger centres the rest room should be centrally located, an attractive room in a women's building; not of necessity a large structure, but a place where the women's organiza-

tions of the district might have their meeting place or club rooms; one room to be a rest room, where every woman would be welcome, and the municipal council to pay for the rental and upkeep of this.

There would be a kitchenette with oil stove and dishes, where, for a small charge, anyone might make a cup of tea or procure hot water; a lending library at a small fee; a women's exchange where all kinds of women's work might be sold on commission—from garden and dairy produce to cooking and needlework; and proper and complete sanitary conveniences.

In the smaller centres, a comfortable room could be easily arranged, with a bulletin board, where those frequenting the room might list any articles they had for sale; a lending library could be opened once a week; and sanitary conveniences arranged.

These rooms would have to be started by some women's organization and under their oversight, but as they are public conveniences for women and children, and sorely needed, they should be financed by the municipality.

THE COWICHAN INSTITUTE

BY ROBIE WHIDDEN, SECRETARY

THE Cowichan women's institute rest room was established three years ago, it being felt that members from a distance would be glad of a place where they could rest, write letters, meet friends, etc., when in town. It has more than fulfilled our expectations. We have in connection with our institute an excellent library, where books are distributed to the members four days in the week. The room is open daily from nine to six o'clock. During the winter months a fire is kept on all that time, and the members have the use

of the crockery and other necessities to make a cup of cocoa or tea.

The monthly meetings are held in this room which is also used frequently for social evening gatherings.

The upkeep of the undertaking amounts to about twenty dollars a month which is paid from institute funds. The president, Mrs. Blackwood Wileman, and directors feel it was a move in the right direction and would strongly recommend those institutes that have not adopted the plan to do so.

NOVA SCOTIA

AGRICULTURAL ACTIVITIES

BY J. S. ARCHIBALD, B.S.A., ASSISTANT CHEMIST

OWING to the epidemic of influenza, the opening of the Nova Scotia Agricultural College at Truro had to be postponed from week to week. It was hoped that it would be possible to open on Nov. 26th, but as the epidemic was still flourishing, the date was set for Dec. 3rd. It is planned to continue the classes through the Christmas vacation and extend the date of closing in the spring one or two weeks beyond that advertised.

RETURNED SOLDIERS' COURSE

Educational work for returned men who plan going on to the land, has been commenced at the Agricultural College. One year ago, two or three men reported for such a course, and were taken into such of the regular classes as seemed best suited to their needs.

This year, however, a special course has been inaugurated, particular emphasis being placed on practical work. The men are being given actual instruction in the ordinary farming operations, such as harnessing, ploughing, harrowing, thrashing. At this date twelve students are enrolled in this course and it is expected that this number will be increased. The length of the course will be eight months. As the class increases in size, plans will be formulated for placing the men for their practical work on various provincial farms under the observation of members of the college staff.

WHEAT

The recent post-card census taken by the Census and Statistics Office at Ottawa, shows an acreage of wheat in Nova Scotia this year of 32,000 acres as compared with 14,000 acres in 1914. The crop has been large and fairly well harvested.

To help bring about this very material increase, and to take care of it, the Provincial Department of Agriculture introduced some time ago, a policy of assisting in the establishment of small roller process mills throughout the province. The policy is a graded one, more substantial assistance being given to such mills as are established in the outlying districts at considerable distances from the railway, than to those more favourably located. As a result of the material assistance thus afforded eleven new mills have been erected since the war began and at least ten others are in operation.

Although the total increase may seem small in comparison with that in Western Canada, yet it represents somewhere from 75,000 to 100,000 extra barrels of flour for consumption in the province, all of which, when we consider that Nova Scotia is not primarily a wheat-growing province, means so much substitute.

Whether this increase will be maintained or not when normal conditions are restored is uncertain, but it would be a great boon if the farmers of Nova Scotia would reap at least one benefit from the war and learn to grow more of their own feed and import less.

BEANS

The special effort made last spring by the Horticultural Division of the Agricultural College to encourage bean growing by supplying seed of early maturing sorts, was largely nullified by the exceedingly unfavourable season. Late spring and early autumn frosts combined, with continued wet weather, were most detrimental to the bean crop. Results show, however, that where the Early Six Weeks bean was sown, a good crop was secured from it, while the stan-

dard varieties, such as Yellow Eye, failed.

The unfortunate feature of the "Six Weeks" bean is the colour (a greenish brown) and a rather thick, tough skin. While many like it, the quality is conceded to be inferior to the Yellow Eye. There is an opportunity for investigation here along the lines of plant breeding, viz., an endeavour to improve the quality of the bean, and yet retain its early maturing characteristic.

THE FEED SITUATION

Nova Scotian farmers are faced this year with even a more serious problem as regards feed, than they were a year ago. In many districts the hay crop was very short, and the promise of

a most bountiful grain harvest was shattered by the unprecedented wet weather of September and October. Roots are the only crop which came up to expectations. Mill feeds are scarce and prices prohibitive. As a consequence many farmers are disposing of as much stock as possible and beef is a dead letter, so easy to obtain that the drovers can scarcely be induced to buy.

In one line, however, the Department of Agriculture has given considerable aid by importing and distributing some 2,000 tons of linseed oil-cake meal purchased in New York.

Further substantial assistance has also been given by the Feed Division of the Live Stock Branch of the Federal Department of Agriculture.

NEW BRUNSWICK

DEPUTY MINISTER OF AGRICULTURE

MR. E. P. Bradt, Morrisburg, Ont., who has been Agricultural Representative of the Ontario Department of Agriculture for Dundas and West Stormont during the past six years, has accepted the position of Deputy Minister of Agriculture with the New Brunswick Government with headquarters at Fredericton.

Mr. Bradt grew up on his father's farm in Haldimand County, and graduated at the Ontario Agricultural College in 1912. As Agricultural representative he has been especially successful in school fair and organization work and is strong in live stock and teaching. In 1917 his judging team won the championship for Eastern Ontario at the Ottawa Winter Fair, and later, with the same class, won the premier honour for the province at Toronto. Mr. Bradt will

assume his new duties about January 15th.



MR. E. P. BRADT, B.S.A., DEPUTY MINISTER OF AGRICULTURE

ONTARIO

THE GOVERNMENT TRACTOR SERVICE

BY C. E. HOLLIDAY, TRACTOR SUPERVISOR

FOR the past two years the Ontario Department of Agriculture, as a feature of its campaign of greater production, has adopted the policy of introducing and demonstrating the usefulness of tractors on the Ontario farm. The work that was accomplished in 1917 was reviewed by Mr. Bailey in THE AGRICULTURAL GAZETTE for May, 1918. The experiences of the first year led to some changes in the policy for 1918, when an aggressive line of action was carried out.

A COURSE IN MACHINE PLOUGHING

In order that knowledge of the operation of farm tractors might be obtained, on the prompting of the Department, the Ontario Agricultural College arranged a two weeks' course in farm ploughing, embracing the subject of tractors, automobiles, gas engines, and electric motors, at which 155 farmers' sons and mechanics attended. Eleven different types of farm tractors were demonstrated and the lectures on structure, design, gears, magnetos, carburetors and radiators were supplemented by actual operation of the tractors under the direction of manufacturer's experts, who also gave demonstration of lining shafts, babbitting bearings, and other matters of relative interest. That the knowledge may become more general Agricultural Representatives have had special machines of standard makes at their disposal that they might explain their operation to the farmers in their different counties. While it is not possible to give the exact figures, so far as can be ascertained 770 tractors were employed on Ontario farms during the month of June.

RENTED TRACTORS

To better demonstrate the use and usefulness of the farm tractor the

Department secured a score of tractors which were rented out to farmers in various parts of the province. Application for these tractors were so numerous, that, ultimately, the province had purchased an aggregate of 127. All are equipped with three-furrow ploughs and 50 per cent have double disc harrows. Two, three, and four wheel types, and one, two, and four cylinder designs were purchased and distributed, so that similar machines might not be working in the same neighbourhood. The Agricultural Representatives are responsible for the routing and general superintendence of the machines in their counties. The machines were arranged in ten groups, over each of which was an expert mechanic, who gave instructions to new operators, looked after the mechanical repairs, and operated the machines where necessary.

THE CONDITIONS

Applicants for the machines were required to make application to the Representatives, stating the number of acres that they desired to have ploughed or disced. The farmer was required to supply fuel and water at the machine, to board the operator, and to pay \$2.25 per acre for ploughing and \$1.25 for double discing once over. An alternative charge was arranged for of 50c. per hour, plus 50c. per acre, in addition to fuel and board, the charge in no case to exceed \$2.50 per acre. The methods were optional. When the machines were not ploughing, they were sometimes rented to the councils for road work. Seventy-eight of the tractors have also been engaged in silo-filling. Gradually the difficulties experienced in operating and taking care of the machines are being overcome.

GOVERNMENT TRACTORS TO BE SOLD

Realizing that the purpose of this service has been accomplished, owing to the conclusion of the war, it has been decided to dispose of the machines to farmers or others who desire to purchase them. Already a number of the tractors have been secured by farmers who learned of their usefulness at the expense of the Department. The remaining machines

are being put into sheds at central points in the province, where they are being overhauled and put in good working order for further private sale, or to be disposed of by auction before the next seeding season arrives. It is understood that there are now about 1,000 privately owned tractors in this province and the interest in the subject has been developed, to a considerable extent at least, through the work of the Department.

A CALF CLUB ORGANIZED.

BY G. B. CURRAN, B.S.A., AGRICULTURAL REPRESENTATIVE.

WE are organizing a Calf Club in Lennox and Addington County district and from the interest already exhibited we have hopes of distributing one hundred and fifty calves to boys and girls in the spring. We have departed somewhat from the usual system of buying the calves and allowing the boys and girls to draw lots for them. Instead of this the members of the club are permitted to select their own stock at whatever price within reason they choose to pay. It is realized that the children will take more interest in the stock that meets their personal preference than what may be obtained as

the choice of another. The local bank lends the full purchase price of the animals on the note of the member endorsed by his or her parent or guardian, for one year. At the end of that time, if the member finds it necessary, he can have his note renewed by paying the interest at six per cent. Only registered pure bred heifers will be bought, and it is expected that fully 85 per cent of the calves will be Holsteins, 10 per cent Shorthorns, and 5 per cent Herefords, Angus or Ayrshire. Only dairy calves will be given in the southern or dairy districts and beef calves in the northern or beef raising section.

LIVE STOCK JUDGING COURSES

BY J. W. NOBLE, B.S.A., AGRICULTURAL REPRESENTATIVE

THE South Essex Board of Agriculture and the Department of Agriculture (Essex) Live Stock Judging Courses, were conducted by Messrs. J. M. McCallum of Shakespeare and R. S. Stevenson of Ancaster during the week of Nov. 26-30.

At Goldsmith, on Tuesday, classes of beef cattle, sheep, and hogs brought out lively discussions, about forty farmers being present. The classes of stock judged were Lincoln sheep,

Shorthorn cattle, Duroc hogs. On Wednesday, at Cottam, Clydesdale horses, Shorthorn cattle, and Lincoln sheep were the subject of discussion and demonstration to about thirty farmers. The meeting arranged for Malden on Nov. 29th was cancelled on account of an epidemic of influenza in the township, all meetings being banned by order of the Board of Health.

On Saturday the annual live stock judging competition for the county was

conducted at Kingsville. Contestants were conveyed to the farms, where the live stock judging took place, and the boys were required to give oral and written reasons for their placings in each class. Classes of Percheron stallions, Hereford cattle, Holstein cows, Oxford ewes, and Duror Jersey brood sows gave the boys an excellent opportunity of demonstrating their

ability as judges. Some good work was shown in the placing and giving the reasons for placing in each class. The cup was won by John H. Wilcox, Woodslee, which gives him final possession, he having won the trophy three times. The competition was open to young men under 25 years of age.

COUNTY PLOUGHING MATCHES

Agricultural Representatives in several counties of Ontario conducted ploughing competitions on the farms of the individuals instead of having the competitors brought together on the same farm as in the usual ploughing match.

In Welland County, Mr. E. K. Hampson has organized the Welland and Lincoln Home Ploughing Association. Each contestant was required to plough at least an acre. The work was done under the following regulations:

1. Each competitor must plough at least one acre which will contain at least one stroke and one finish.
2. The approved depth of ploughing is six inches.
3. Competitors in all classes are allowed the privilege of drawing scratches and finishing with single ploughs.
4. Written proof of age by parent or guardian must accompany each entry in boy's classes.

5. Satisfactory evidence that ploughing is the work of the competitor must be furnished on request.

The score card:

Strikes	15
Finishes	15
Uniformity of depth and width of furrow	15
Ins and outs	5
Crown of ridge of land	15
Straightness	15
Practicability	20
Total	100

The work, though of a similar nature, was not necessarily uniform in other counties. In Peterborough county Mr. F. C. McRae had 15 entries, 11 in the men's class and 4 in the boys. In Grenville county, Mr. W. M. Croskery had 12 entries in the sod class and 6 in the stubble. It is Mr. Croskery's intention next year to have a class for two furrow ploughs.

CANNING CENTRES

THE Institutes Branch of the Department of Agriculture has established community canning centres at seven points—Parkhill in Middlesex County, Barrie in Simcoe County, Niagara-on-the-Lake in Lincoln County, Mapleton in Elgin, Guelph in Wellington, Stratford in Perth, and Grimsby East in Lincoln. At these centres supplies of fruit, vegetables, and chicken are put up for use in the Canadian mili-

tary hospitals overseas and in Canada. Opportunity is also afforded in the centres for the women of the community to bring their own produce, containers, and supplies, and put them up for private use. This work began a year ago, when a well equipped centre was established at Parkhill. At this point, and at Barrie, large quantities of chickens are being canned, the objective at each of these centres being ten thousand birds.

The Department of Agriculture provides sufficient modern equipment for carrying out the work in a thoroughly scientific manner. This consists, in the main, of a boiler for steam supply, large galvanized steam kettles, vats, pulping machines, closing machines, and apparatus for sealing tin cans. In the majority of cases a motor is provided for power supply.

Women's organizations outside the institutes have generously co-operated in supplying free labour. The Department of Agriculture furnishes a qualified demonstrator to each centre. Various agencies have co-operated in supplying the necessary

materials. Sugar, containers, vinegar, and spices, have been furnished by the Canadian Red Cross Society. The Red Cross canning kitchen at Hamilton, and the provincial Experimental Fruit Station at Vineland, have helped greatly in organizing the work, installing the equipment, and, in many cases, directing operations. Much of the fruit and vegetables utilized in these centres would have been wasted had not this work been organized. An objective to the value of \$100,000 for overseas shipment is expected to be reached in the various centres this season.

MANITOBA

CO-OPERATIVE CREDIT OPERATIONS UNDER THE RURAL CREDITS ACT

BY E. A. WEIR, B.S.A., AGRICULTURAL DIRECTOR, RURAL SOCIETIES CREDITS

THE Manitoba Rural Credits Act was passed in March, 1917, and the first society at Selkirk, twenty miles north of Winnipeg, commenced operations late that season, about June 15. The Act provides for a system of short term loans for seasonal operations and to increase production. During the season of 1918 ten societies have been in operation and their total credits approved up to November 1, 1918, were as follows:—

OBJECTS OF THE LOANS

This money was loaned for a great variety of purposes, including the following: Breaking land, buying horses, milch cows, pure-bred bulls, stockers, pigs, seed grain, feed, twine, portable granaries, machinery, fencing, digging wells, making building improvements, paying threshing bills, paying floating liabilities, etc. A summary of amounts loaned for various purposes is as follows:—

Roblin.	\$47,406
Minitonas.	31,475
Swan River.	25,135
St. Andrew's.	22,648
Arden.	17,900
Lansdowne.	16,495
Lawrence.	12,420
Westbourne.	10,785
Glenella.	9,850
Tenby.	8,220

Putting in and harvesting crop.	\$64,606
New breaking.	53,190
Purchase of stock.	36,618
Floating liabilities.	19,860
Machinery.	17,035
Improvements.	9,445
Threshing.	1,580
Total.	<u>\$202,334</u>

WHAT HAS BEEN ACCOMPLISHED

Through this method of loaning much production has been possible that otherwise could not have been accomplished. It is conservatively estimated that over 12,000 acres of new land has been broken that could not otherwise have been done, and several thousand acres summer-fallowed properly. The item for live stock represents the purchase of swine, stockers, and feeders that otherwise could not have been accomplished, and also some pure-bred sires to improve existing herds. Mixed farming on a sound basis has been placed much closer within the reach of these borrowers.

By means of the rural credit societies many farmers are put immediately into position to do what they could hardly attempt inside several years working on their own resources. One farmer in the St. Andrews Society last year broke up fifty acres with part of a loan of \$1,000. He thereby doubled the acreage he would otherwise have had in wheat, and secured an average crop of over 33 bushels per acre, making a gross return of over \$3,300, he could not otherwise have had, for though a most industrious, honest, and thrifty man he had been refused credit through the regular channels. A borrower in the Roblin Society (Shell River Municipality) last spring had previously secured a quarter section of land. He did not at first take kindly to the scheme, but when the matter was fully explained to him he decided to take out \$300. With this a tractor was hired and 60 acres broken. Another \$200 was taken out to have this disced and to purchase seed, etc. In the meantime, his own outfit had broken 40 acres, so that now he has a field of 100 acres of new breaking all in good shape for next year's crop. A loan of \$400 had enabled another man to break and prepare 60 acres, which, he declared, would have taken him several years had he been thrown entirely on his own resources.

AN EXPEDITIOUS EXAMPLE

An interesting case was that of a man of ample resources. One day he got a chance to secure a bunch of cattle which required a considerable amount of ready cash to handle. He applied to the bank, but the amount was in excess of that which the manager could lend on his own responsibility. To have furnished details to the head office and secure its consent would have taken considerable time and the opportunity would have been lost. He applied to the society for the amount required. A phone message was sent to the president, who immediately called a meeting. The directors were gathered together and the application approved. The cheque was made out and deposited to his credit the next morning. In the meantime, he had caught a train for Winnipeg, where he was to secure his cattle. The next morning he wired for the money, closed the transaction, and came back, with a bunch of stockers. The opportunity would have been lost but for the timely assistance of the credit society, and the prompt action on the part of the directors in assisting their neighbour to seize a favourable opportunity when it offered.

THE METHOD PURSUED

The method of loaning is simple. The plan of organization was described in Vol. 5, No. 8, of THE AGRICULTURAL GAZETTE. Fifty farmers subscribed to one share of \$100 each, which represents the maximum liability of each for the debts of any other member. Only 10 per cent of each subscription is paid up, however. The rural municipality in which the Society is located and the provincial Government each subscribe to one-half the total stock taken by the farmers. Ten per cent of these subscriptions are also paid, making a total subscribed capital of \$10,000 with \$1,000 paid. This sum is invested in a sound security, and the proceeds go to the credit of the society

to be used to pay expenses, pay a dividend up to six per cent, or establish a reserve fund as the directors see fit. The farmers, municipality, and Government each name three directors on a board which deals with all loans. One of the Government directors is an agricultural graduate, who is available to make inspections and see that loans are spent for the purpose intended. All loans must be approved by a majority of the full board of nine directors. This local directorate is not only a great safeguard but it ensures many men getting loans who could not otherwise hope to do so. This has been proven many times.

LESSONS IN FINANCING

The local board also can often give a man a good lesson in financing. His plans are laid before the board of directors, most of whom are, of course, successful business farmers in the same neighbourhood. If a man through inexperience has been tempted to engage on what might prove to be an unprofitable project, the loan which he endeavours to secure to carry it on is, of course, refused. But the directors in such cases have shown a desire to assist their neighbours and give them the benefit of their experience. A loan may be granted on condition that it is used in the way that the board advises. For instance, a man in one society wished to secure money to purchase a small tractor. In the judgment of the board, the land which he was to work was hardly suitable for getting the best services out of a tractor, and he was advised to buy horses. The money was advanced to do this, and he is now making splendid progress, fully convinced that the advice he received from the board was sound.

THE REQUIREMENTS

Character and farming ability are taken into full account by this board, each of whom has had ample

practical experience himself. The board also have laid before them with each application for a loan, a detailed financial statement of the borrower. This includes the number of acres owned and the location; the number of acres broken; encumbrances, if any; a complete valuation of all assets, including farm lands, buildings, implements, live stock, supplies, cash, and outstanding accounts. A complete statement of liabilities, including mortgages on farm property, chattel mortgages, lien notes against machinery or implements. Amounts due the bank or other parties is also given. Statements as to the amount of fire, hail, and life insurance are included, though these do not figure in the amount of assets and liabilities. This statement, made by the applicant, is carefully scrutinized by the board, and revised if necessary. The excess of assets over liabilities or surplus assets, as they are called, represent, therefore, the farmer's net financial worth.

CHARACTER OF THE SURETIES

It is interesting to notice the net financial worth of some borrowers. In Arden society twenty-nine borrowers were granted credits of \$17,900. Their total surplus assets were over \$358,000. In Roblin seventy credits totalled \$47,407, and the surplus assets were \$650,000; surely ample security aside from the other safeguards carefully provided by the Rural Credits Act and described in the article previously referred to. Yet these loans represent real and great assistance to these farmers from conditions that hampered production.

The money is loaned at seven per cent, one per cent of which goes to pay the expenses of the society and six to the bank. The money is secured through the regular branch banks where the societies are located. The notes come due before December 31 of the year in which they are granted. When they are for land breaking, or the purchase of live stock,

they are renewed until the following December 31st, or until returns are secured from the land or stock. Thus the loan is a direct incentive to production. Farmers are not called upon to sacrifice live stock at an inopportune time, or to haul out grain in the fall when they should be ploughing for next season, and every one knows with threshing and labour shortage the fall season in the West is very short. Interest is paid on the various parts of the total credit extended, only as the money is actually required. A farmer received the actual amount of the loan, not the face amount less a deduction for interest.

NOTES SATISFACTORILY MET

The St. Andrews Society started operations in June, 1917. The directors that season approved credits of over \$16,000, but only 60 per cent

was actually used. This year credits of almost \$23,000 were approved and 95 per cent has been actually used. Every borrower last year was a borrower again this year with one exception. Every loan was paid last fall on or before due date, except a few for breaking and live stock, which were renewable. This year two months before the notes are due 15 per cent have been paid up.

Conservative opinion says that the Selkirk district has gone ahead 60 per cent in the last two years through the accomplishments made with the additional loans and the community spirit engendered by the society, for the benefit is not purely financial but also largely social. A sure foundation is also being laid for further co-operative action. Many farmers are placed on a cash basis and are encouraged to keep better farm accounts and generally adopt more businesslike methods.

THE SHORT COURSE SCHOOLS

BY GEORGE BATHO, EDITOR OF AGRICULTURAL PUBLICATIONS

THE first arrangement as to the holding of short course schools in Manitoba was broken by the influenza epidemic. The courses were to have begun in November and continued three at a time until all were completed.

The impossibility of carrying out this plan has necessitated a complete rearrangement of dates; and now four circuits are planned, beginning after the opening of the New Year.

Fortunately, the situation has been relieved by the change in the military outlook. Some members of the Extension staff who were overseas will be back again, and four circuits can be conducted, instead of three.

Equipment being sent out by the

Extension Service for each short course occupies a big automobile car. For each course a staff of six instructors is provided. The lectures are given each day for the two-weeks period on gas engines, live stock, field crops, farm book-keeping, cement construction and home economics. In addition to these there will be three other series of short courses each of one week devoted mainly to dairying, poultry raising and bee-keeping and at each of which a staff of three lecturers will be employed. If circumstances allow the planned circuits to go on, between twenty-five and thirty instructors will be constantly employed.

SASKATCHEWAN

PUBLIC HIGHWAY CONSTRUCTION

BY H. S. CARPENTER, DEPUTY MINISTER OF HIGHWAYS

UNDER the Highways Act of 1917, the Department of Highways was established to take over the administration of expenditure in connection with the maintenance and improvement of highways in this province previously carried on by the Board of Highways Commissioners. This department is now a regularly constituted department of the public service under the administration of the Minister of Highways and his Deputy, and has the administration of all moneys voted by the Legislature for the construction and maintenance of roads, bridges, and ferries.

The moneys voted by the Legislature for these purposes for the fiscal year 1918-19 are as follows:

Chargeable to Revenue

Roads and bridges including aid to rural municipalities	\$ 310,000
Ferry accommodation	100,000

Chargeable to capital

Construction of highways..	270,000
Construction of permanent steel and concrete bridges..	110,000

The above amounts will all be spent during the present year for the purposes for which they are voted, with the exception of the \$270,000 voted for the construction of highways. Because of conditions brought about by the war it has been the policy of the Department this year, as in the previous three years, to limit expenditures on our highway work to the lowest possible amount consistent with the maintenance of such roads as have been built, and the construction of only such new works as seem necessary in order that our farmers may be in a position to market the grain that they have been urged to grow to the end that production might be maintained to the highest possible extent. For these reasons no expenditure has been made from the \$270,000 voted

from capital for the construction of highways.

It is hoped, however, that now the war is over, more moneys will be available for carrying out the important work in connection with the construction and maintenance of our highways, and, with this end in view, the Department has devoted a great deal of time towards making preparation for increased activity as soon as conditions will permit. Early in the present year the province was divided into eight divisions for the purpose of highway administration, and a divisional superintendent placed in charge of each division. It is the duty of these divisional superintendents to control the expenditure of departmental money in each of their divisions, and to examine and report to the Department as to conditions of the highways, and to make recommendations as to the requirements of each division. A good deal of time has also been given this year to the revision of our main road system, making such modifications and extensions to this as will tend to its improvement. It is hoped, when this work has been completed, that in the older parts of the province, at least where railroad construction may not be expected to be continued to the extent that has been the case in the past few years, and where most towns have become pretty well established, that this main road scheme can be permanently carried into effect.

ADMINISTRATION OF EXPENDITURES

Moneys authorized by the Department for the construction and improvement of roads are expended either by Government road crews controlled and financed directly by the Department, or by means of contracts entered into with rural municipalities, whereby a rural municipality agrees

to look after the expenditures authorized by the Department for the construction of a certain specified road, in accordance with the Department's specifications; the Government to reimburse the municipality when the work has been satisfactorily completed and a certificate to this effect been obtained from an official of the Department. The ferry service is free and is maintained and operated directly under the control of the Department. Small timber bridges are for the most part constructed by Government bridge crews directly under the control of the Department, working on a day labour basis. The larger bridges consisting of steel bridges on concrete abutments are let by contract.

For the purpose of encouraging rural municipalities to look after the maintenance of earth roads, a direct grant is made to each municipality of a large amount of the revenue derived from motor license fees. This money must be used only for the maintenance and repair of main roads leading to market towns.

RURAL MUNICIPALITIES

In rural municipalities the money for road and bridge construction is obtained generally from current taxes, though municipalities have in the past raised money for this purpose from the sale of debentures. No specific taxes are levied in rural municipalities for road improvement work, or other public work. The council sets aside from revenue of the municipality so much as it determines can be allocated for the improvement of such roads as the council selects. The Department of Highways exercises no authority, or control, over the expenditure made by a rural municipality, or over the selection of the roads upon which the council will spend its money. There are exceptions to this, however, in cases where an agreement is entered into between the Department of Highways and the rural council for a certain improvement to which both the Department and the council contribute, in which case, of course, the expenditure must be made on a location approved by the Department.

RESIGNATION OF HON. W. R. MOTHERWELL

THE resignation was announced on December 12th, 1918, of the Honourable W. R. Motherwell, Minister of Agriculture for Saskatchewan since 1905. Subsequently it was stated that the Honourable

Geo. E. Langley, Minister of Municipal Affairs, was assuming the duties of Minister of Agriculture during the present session of the Legislature, and that afterwards there would be a rearrangement of portfolios.

STUDENT ENROLMENT, 1918-19

On account of the epidemic of influenza which swept over Canada, the opening of some of the agricultural colleges and schools was interfered with, the Saskatchewan College of Agriculture and the agricultural schools in Alberta remaining closed until the New Year. The following statements give the number of students enrolled at those institutions that have opened and the veterinary colleges in Canada for the college year 1918-19:

NOVA SCOTIA AGRICULTURAL COLLEGE

THE enrolment of students at the Nova Scotia Agricultural College includes a number of returned soldiers. Following are the enrolment figures:

First year.....	16
Second year	18
Returned Soldiers' Course	11
Total	45

MACDONALD COLLEGE

The enrolment of men and women for the different years for Macdonald College is as follows:

<i>School of Agriculture—</i>	
1st year.....	16
2nd year.....	15
3rd year.....	4
4th year.....	None
Total	35

<i>School of Household Science—</i>	
Institution Administration, Senior..	15
Institution Administration, Junior.	3
Homemakers.....	38
Autumn Short Course	10
Special students—Sewing	2
Total	68

SCHOOL OF AGRICULTURE, STE. ANNE DE LA POCATIERE

The School of Agriculture has accepted this year students as young as fourteen years for the various classes, the numbers enrolled being as follows:

<i>Agricultural Course—</i>	
First year.....	17
Second year.....	8
Third year.....	17
<i>Short Course—</i>	
First year.....	57
Second year.....	6
Total.....	105

OKA AGRICULTURAL INSTITUTE, LA TRAPPE

The fall course at the Oka Agricultural Institute opened with the following enrolment of students:

First year.....	30
Second year.....	9
Third year.....	12
Fourth year.....	12
Special courses.....	47
Total.....	110

ONTARIO AGRICULTURAL COLLEGE

In the agricultural course there are 4 women in the first year and one in the third year. Following is the enrolment for the different years:

<i>Agricultural Course—</i>	
First year	84
Second year.....	36
Third year.....	19
Fourth year.....	22
Special courses in Agriculture.....	2

Total agricultural students	163
<i>Manual Training Course—1 year..</i>	3

<i>Domestic Science Courses—</i>	
Jr. Normals.....	14
Sr. "	8
Jr. Associates	27
Sr. "	9
Jr. Housekeepers..	13
Sr. "	17
Homemaker Class	20
Short Course students.....	5

Total Domestic Science students.	113
Total attendance..	279

MANITOBA AGRICULTURAL COLLEGE

Registration at the Manitoba Agricultural College is not yet complete, a good many of the students not being able to come in for a week or two on account of sickness and other reasons:

Students in Agriculture—

First year.....	74
Special class for boys of 14 and 15 years of age.....	14
Second year.....	32
Third year Diploma.....	5
Third year Degree.....	4
Fourth year.....	8
Fifth year.....	10
	<hr/> 147

Students in Home Economics—

First year.....	34
Second year.....	22
Third year.....	12
Fourth year.....	5
Fifth year.....	5
Institutional Management ..	3
	<hr/> 81

SASKATCHEWAN COLLEGE OF AGRICULTURE

On January 2nd the students enrolled were:

Associates.. .. .	44
Degree	21
	<hr/> 65

COLLEGE OF AGRICULTURE ALBERTA.

In addition to the regular course in agriculture, instruction is given in a special course for invalided soldiers. Most of the first and second year work in this province is given at the Schools of Agriculture. Following is the enrolment:

Third year.....	8
Fourth year	5
Final year	5
Returned soldiers	45
	<hr/> 63

BRITISH COLUMBIA COLLEGE OF AGRICULTURE

The British Columbia Agricultural College is not yet fully equipped. All students proceeding to the B.S.A. degree are required to hold matriculation certificates. This high standard results in a small enrolment. For the college year just opening the enrolments are:

First year... ..	8
Second year.....	4
	<hr/> 12

ONTARIO VETERINARY COLLEGE

Seventy-five students have enrolled for the college year. These are divided in the different years as follows:

First year	19
Second year.. . . .	18
Third year.. . . .	38
	<hr/> 75

SCHOOL OF COMPARATIVE MEDICINE AND VETERINARY SCIENCE, MONTREAL

The class at the School of Comparative Medicine and Veterinary Science is smaller than usual but additional candidates are expected with the demobilization of the army:

First year	6
Second year	8
Third year.. . . .	16
	<hr/> 30

RECAPITULATION

<i>Institution</i>	<i>Men</i>	<i>Women</i>
Nova Scotia Agricultural College	45	..
Macdonald College.....	35	68
Ste. Anne de la Pocatiere.....	105	..
Oka Agricultural Institute.....	110	..
Ontario Agricultural College.....	162	117
Manitoba Agricultural College.....	147	81
Saskatchewan College of Agriculture.....	65	..
Alberta College of Agriculture.....	63	..
British Columbia Agricultural College.....	12	..
Ontario Veterinary College.....	75	..
School of Comparative Medicine and Veterinary Science.....	30	..
Totals.....	849	266

PART III

Junior Agriculture

DEMONSTRATIONS, COMPETITIONS, AND CLASS-ROOM STUDIES IN
RURAL LIFE FOR BOYS AND GIRLS

DOMESTIC SCIENCE IN RURAL SCHOOL

NOVA SCOTIA

BY L. A. DEWOLFE, TRURO, DIRECTOR OF RURAL SCIENCE

PRACTICALLY every town in Nova Scotia has its Domestic Science Department. In rural districts, however, we are only beginning.

There is no incentive for the teacher to teach an extra subject. The people do not demand it. The school of a generation ago suits the people of to-day. A few energetic teachers, however, teach sewing about one hour a week. Possibly 100 teachers conduct sewing classes part of the term. Owing to the need of greater equipment, practically no one undertakes cooking.

There is no grant to defray expenses of sewing or cooking materials or equipment. Any teacher who attempts such work devises her own means of supporting it.

All our Normal College students receive instruction in Domestic Science; but they do not make any use of it in their future teaching. Moreover, a large proportion of our rural teachers have never attended any training school; and, consequently, do not know such a subject as Domestic Science exists.

This year we have seven travelling rural science teachers. Each one is responsible for the agricultural and home-making subjects in about a dozen schools. During the winter months, these teachers will inaugurate Domestic Science classes. By next spring, therefore, we hope to report actual progress.

Already these travelling teachers have done good work in canning. At our last summer session in Truro, every student was required to do practical work in canning. The travelling teachers gave special attention to this topic. As soon as schools opened in August, they began canning work for the fall school exhibitions. At a number of exhibitions, these teachers gave public demonstrations in this subject. At the school exhibition in Laurencetown there were 700 jars of canned vegetables—the work of the children in one month under the direction of Miss Henderson.

The travelling teachers will also attempt introducing the hot lunch into rural schools. Miss Marsters has already made a start in Avonport. Here is what she says: "Last Monday, a rainy, disagreeable day, the school at Avonport enjoyed its first hot lunch. Two little girls helped make cocoa; two others served as waitresses; two more as dishwashers; while another acted as treasurer, collecting one cent from each pupil present. How the little folk enjoyed it all! The greater part of the equipment was purchased with funds raised at the school exhibition, which, by the way, was a great success. In a sewing lesson which preceded the lunch, the little girls made a holder."

From this you will see that we have passed that vague point where we are "going to do something." We are actually doing something. Though

our beginning is small, we have the workers in the field; and actual results are so near that we view with

confidence the possibilities of the present year.

NEW BRUNSWICK

BY FLETCHER PEACOCK, DIRECTOR MANUAL TRAINING AND HOUSEHOLD SCIENCE,
DEPARTMENT OF EDUCATION

PRACTICALLY all the urban schools of New Brunswick have departments of household science. Instruction in this subject is given to girls of grades 6, 7 and 8. In the consolidated schools it is also taken up throughout the high school grades. The curriculum further provides that certain phases of the study of the home be taken up in the lower grades.

Until last year no progress was made by this department in extending this practical subject to the rural schools. Thus fully 50 per cent of the girls of the province had not been given the advantages in this connection offered by town schools.

WAR REQUIREMENTS OPENED THE WAY

When the movement for greater food conservation was being launched, this department undertook to mobilize the girls of the province to do their share in the important work. The girls from 10 to 18 years of age were asked to form themselves into "Home Efficiency Clubs" in the different communities. These organizations soon became quite general, especially throughout rural New Brunswick. Their immediate object was the canning and preserving of foods; but they have also done a great deal of Red Cross sewing, etc., during the past year. The work has all been headed up in the schools, and the teachers are the local leaders.

It is the policy of this department now, to make these clubs permanent, and through them to take up the various phases of household science work; and it is believed that in this way the subject may be extended even to the remotest districts.

A club supervisor has been ap-

pointed, and during the past summer, she had about 30 helpers working with her. The clubs are now active in about 200 localities.

A PROGRAMME FOR THE WHOLE YEAR

A definite full-year programme has been planned, and is now being worked out. The club supervisor or one of her expert helpers aims to visit each school once a month, to encourage and instruct the club. The local teacher is usually the honorary president. Through her help and the monthly visits by the expert, interest is easily kept up, and the work made continuous.

During the canning season food preservation is made the leading task of the clubs. In November and December lessons in bread-making, using substitutes, are given. During the winter months, sewing lessons in Red Cross work are presented, also work in housekeeping and home nursing.

In the spring, problems of cleaning and house furnishing are considered and the girls encouraged to prepare for the canning season, by planting gardens. Thus the problems of each season are dealt with as they appear, and when the community is interested in them.

ALL THE WORK IS PRACTICAL

The methods followed by the club supervisor and her helpers are all practical. Lessons, not simply demonstrations, are given. Take for example—a lesson in canning. The supervisor notifies the club officers a few days before her visit. These officers have the necessary equip-

ment in order at the school or other suitable place. Each girl brings a quantity of fruits or vegetables and her own containers, at the time fixed, and actually performs all the operations under the direction of the expert. The girls are then able to "carry on" in their own homes, and will report at the next visit of the supervisor what they have accomplished in the meantime.

THE NORMAL SCHOOL EMPHASIZES RURAL HOUSEHOLD SCIENCE

During the past year the household science department at the provincial normal school has laid particular stress upon the extension of this subject to rural communities; and the function of the home efficiency clubs in connection with the common schools. This policy will be continued, so that in a very few years a large number of our teachers will be in a position to carry on the domestic science work without much assistance from the travelling experts.

SCHOOL LUNCHES

The value of a warm lunch to pupils in rural districts is appreciated in this province, and the normal school department in conjunction with the club supervisor is working upon the problem of supplying it.

GOVERNMENT GRANTS

In New Brunswick rural domestic science is supported by government grants to the extent of paying one-half the cost of the equipment used, and \$50 per year extra to any qualified teacher who devotes not less than three hours per week to the teaching of the subject.

SUMMER SCHOOLS

During the past two years short summer courses have been held for teachers of domestic science. At these the problem of carrying the subject to rural localities has been the leading one dealt with. In future it is planned to extend these courses.

QUEBEC

BY ANITA E. HILL, HEAD, SCHOOL OF HOUSEHOLD SCIENCE, MACDONALD COLLEGE

TO the casual observer it may appear that as far as household science is concerned very little is being done in the rural schools throughout the English-speaking districts of this province. However, a casual glance is never a thorough one, and on investigation and closer observation one will discover that this branch of work has been receiving, during the past three or four years, more and more attention. The interest in the work is sure to increase, as the parents and those in a position to encourage the work are most anxious to see it grow, and are doing all they can to stimulate further interest and at the same time co-operate with the children and aid them in their work.

The provincial government is doing much to encourage the work and to each academy which undertakes to

teach household science it gives a yearly grant of \$300. This is for the purpose of meeting the expense of equipment, supplying materials for class work and supplementing the instructor's salary.

The work in the province is practically in its infancy and this grant has not been used extensively as yet. The academy at Shawville has installed an equipment this year and the work is being eagerly watched and as a result it is to be hoped that more academies will take up the work next year. In the work given it is planned to have the lessons meet existing conditions as practically as possible and make the girls taking the course real assistants in the home.

DEMONSTRATIONS

As a great number of schools in the province are small, with a small

attendance, it is almost impossible to have household science given in each one. To meet the needs of the children, however, the scheme of demonstrating to them was decided upon and for the past four years this has been carried on with excellent results. The work is done by the school of Household Science, Macdonald College, in co-operation with the Rural Extension Department of the college. Three or four schools will meet at one centre and members of the School of Household Science staff demonstrate to the children; canning, bread-making, cake-making all receive special attention. A bulletin prepared and sent out by the School gives careful directions which the child may use when carrying out the task at home. Sewing is also being taken up and demonstrations in stitch forms, the use of a pattern and the making of a simple garment are given. In the autumn the children bring their sewing, canning, samples of bread and cake (though the latter was cancelled last year because of war conditions) to the school fair, where these products are judged by instructors from the school. Record is kept of the marks obtained and a sympathetic criticism of the work is made by the judge and the children are told where they fall short of the standard as well as of the merits of their work.

The type of work done each year is improving and it is gratifying to note that after each demonstration the standard of the work is raised. The most important factor is the interest and enthusiasm of the children which speaks well for the future of household science as a school subject, and more than that for the improvement in the standards of living generally.

SCHOOL LUNCHES

The conservation of the child is one of the most vital questions of the day. If the child is to do good work in school and develop into a healthy citizen he

must have proper food. A hot cup of cocoa or a bowl of soup to supplement the school lunch has proved its value in numerous schools. Demonstrations on how to prepare such a hot dish and serve it to the pupils are given by the School of Household Science. In addition the lunch box is discussed; its contents, how it should be packed, and under what conditions it should be eaten are all emphasized. The parents are invited to the demonstration so that their sympathy and interest may be enlisted. A list of the simple equipment required is supplied to any school wishing to start the work. The value of letting the older girls prepare the lunch is emphasized. This lays the foundation for future work in household science, and the older boys and girls when giving their assistance are made to feel that they play an important part in the school life. The teachers in the schools have given invaluable help in this work, and the improvement in the lunch box and noon hour has been most marked. The members of the Quebec Homemakers' Clubs have also given much valued assistance—for example, in the Lennoxville Academy the local club has arranged for and supervises the serving of a hot dish at noon. The children have shown a marked improvement and the club has been inspired to continue its efforts. To the women of these clubs much praise is due for the interest they have shown and efforts they have made to improve the lunch hour and to introduce household science into the schools. The teachers have also co-operated and the work of the children shown at the fairs reflects very much the encouragement and help given by the teacher.

The work is not yet as concentrated throughout the province as we might like, but if the interest, faithful service and enthusiasm of the past five years are continued we may hope for greater development. If this country is to have a fine manhood and woman-

hood to carry out its destiny, its young womanhood must have a knowledge of those things which make for wholesome, attractive homes. When is there a better time for them to begin this work than in their

school days? Where is there a better place for them to learn some of these practical truths than the school? It is their right, let us see that they have their right.

SASKATCHEWAN

BY MISS FANNIE A. TWISS, DIRECTOR OF HOUSEHOLD SCIENCE, DEPARTMENT OF EDUCATION

THE household science work in the Department of Education is in charge of a director, who has five assistants. Two of these assistants are teaching in the two normal schools, and the remaining three are carrying on extension work

THE NOON LUNCH

In June of the present year, Miss Mary Hiltz began her work in the Yorkton inspectorate, directing her efforts towards the establishing of hot noon lunches. With the inspec-

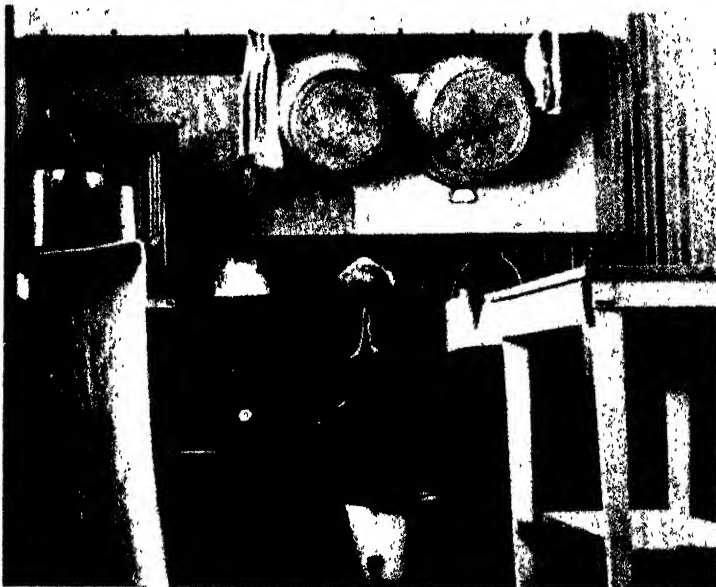


FIG. 1. EQUIPMENT FOR NOON LUNCH, MOSQUITO CREEK, S.D. 3234, PAMBRUM, SASKATCHEWAN

in the rural and village schools in the province. These household science teachers accompany the inspectors on visits to the schools where they discuss the various phases of their work with the teachers, the trustees and the parents. To the hearty co-operation of the inspector of schools, is due, in a great measure, the success of their work.

tor, Dr. Anderson, she visited many schools sending word ahead so that the necessary food materials might be on hand. These were always there in abundance when she arrived. She demonstrated the noon lunch before teacher, trustees and parents having the children make the hot dish under her direction. This showed them how easy it is to operate

and how much enjoyment the children get from it. If necessary she would remain two or three days with the teacher in order to assist her. Since Miss Hiltz began this valuable work, upwards of twenty-five schools have begun operating the hot noon lunch. Many of these are in non-English speaking communities and the great benefit of this reform cannot be over estimated.

Miss Ada Neelands went to the Swift Current inspectorate in July. With School Inspector Cram she went from district to district, holding

having the noon lunch in operation in about twenty-five schools.

Miss Isabel Shaw entered the extension work in September and has been visiting schools in Regina, Moosejaw, and Elbow inspectorates.

ONE PHASE OF THE WORK

Care is taken to impress upon the teachers and parents that although the noon lunch is very important, it is but one phase of household science work in rural schools. The great need of the prairie schools demands attention to this reform first. The

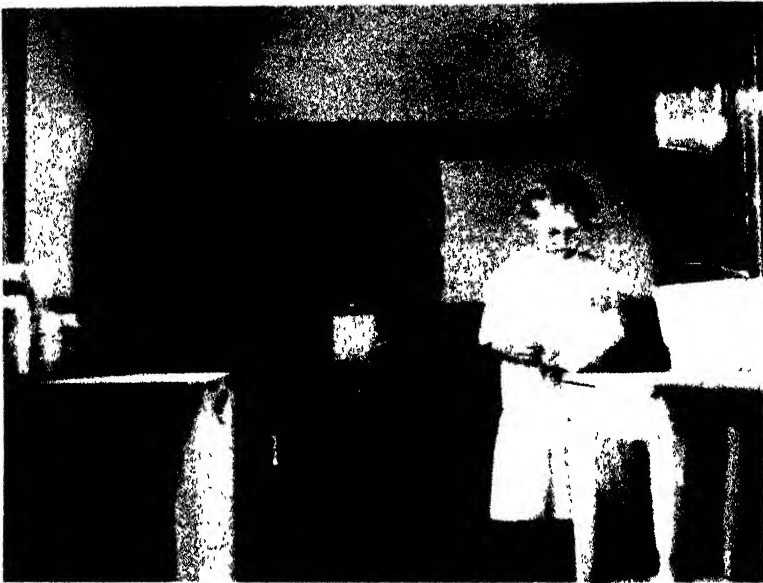


FIG. 2. DOING HER SHARE OF WORK

meetings in the day time or in the evening, whichever was most convenient for the people. This brought her into close touch with the parents and teachers. This method was abandoned when the harvest season began. She then visited the schools, talked with the teachers, took a survey of conditions, and, if there were possibilities of development she had an interview with the trustees. During the autumn she hopes to hold public meetings in the school houses where representatives from several districts can be present. Miss Neelands has been successful in

water supply, the washing facilities and the general cleanliness of the school are noticed closely and improvements suggested. The method of house-keeping necessary for cleaning after the lunch is served, receives the careful attention of the extension worker. The accompanying figure (Figure 1) shows the lunch equipment in the Mosquito Creek School in the Swift Current inspectorate. The teacher, Miss Ethel Finch, teaches her pupils more than the three "R's." She has added a fourth "R", namely, "Right living". Hers is one of the cleanest schools in

the inspectorate. It is one-roomed with a main entry in which are found *clean* wash basin and *clean* towels. In one of the cloak rooms is placed the equipment costing \$21.66. In the other cloak room is stored the dining-table and the benches, all scrubbed clean. On the dining-table stands a neat row of dinner pails. In Figure 2 the pupil is doing her share in preparing the hot dish for the group (Figure 3). The teacher devotes a half hour each week (from one o'clock to half past on Friday afternoon) to "cleaning up". Each

with red cross work. Teachers are urged to form junior red cross societies and to give instruction in sewing with application on red cross articles. At the Swift Current School fair held in October there was a large exhibit of sewing, composed of considerable red cross work such as autograph quilts, bags and other hospital necessities and socks. The secretary reported that nearly one hundred junior societies formed in the vicinity.

Up to the present time the Department of Education has given no



FIG. 3. ENJOYING THE NOON LUNCH MOSQUITO CREEK, S.D. 3234

grade has its share in such work as cleaning black-boards and brushes, dusting furniture, washing chalk troughs and cupboards, scrubbing dining-tables and benches, cleaning and polishing stove, washing towels and lunch cloth, cleaning entries and outbuildings. The half hour is ample time and is part of the noon intermission.

JUNIOR SOCIETIES

Needlework is not omitted by the extension worker. Type lessons are taught and suggestions given for carrying on sewing in connection

special grant for installing equipment for household sciences in rural schools in the province. If \$40,000 were spent in this way each district would not receive a sum equal to half the cost of equipment. The money could be spent with better results if the services of live home economics teachers were secured for the purpose of visiting the schools and the homes of the people. The personal touch is the strongest agency in shaping ideals, and we know that parents are willing to promote the best interests of their children, when once they realize what those interests are.

ALBERTA.

BY G. FRED MCNALLY, SUPERVISOR OF SCHOOLS

IN the course of studies of the Province of Alberta, work in household science appears for all schools beginning with grade V. In Grades V and VI the time is entirely devoted to sewing. The aim of the course is to inculcate habits of neatness and of work; to encourage a respect for sewing as a part of woman's work; to give the girls some power in the selection of proper materials and some ability to care for their own clothes.

In Grades VII and VIII the work deals with cooking, home nursing, first aid and simple house management. Provision has also been made for courses in this subject in the High School. In both Grades IX and X the courses are complete, while a course for Grade XI for both boys and girls is in process of preparation.

The University of Alberta has opened a Department of Household Science this year with an experienced organizer and teacher from the Manitoba Agricultural College at its head. Already the classes are crowded. It may be said this subject is receiving due recognition throughout the Alberta educational system.

From the above it will be seen that the work of Grades V and VI is quite possible of accomplishment in the ordinary rural school and is being carried out in a great many of them.

THE SYSTEM ADOPTED

Systematic instruction in cooking has made little headway outside the urban centres. In rural schools it has been considered more practical and much more valuable to link up this work with the preparation and serving of a hot dish in connection with the noonday lunch.

In the normal schools the teachers in training each prepare and serve practically all the dishes which are recommended by the Department as

suitable for the rural school lunch. In addition they discuss methods of securing supplies, necessary equipment, and the aims to be kept in view in serving this dish.

At the 1918 session of the Summer Schools instruction was given in textiles; theory of foods, first and second years; household art, first and second years; household management, first and second years, and methods in both household arts and household science to about eighty students. In this way those teachers in rural schools who are progressive and anxious to make their work effective prepare themselves for this and similar types of work.

A PRACTICAL DEMONSTRATION

One afternoon during the session the class in household science I prepared about forty lunches, packed them in boxes and pails, and invited the Deputy Minister and the inspectors to the demonstration. After some explanations of the purpose of the demonstration one of the members of the class proceeded to make cocoa for the company, explaining as she went along, how the various steps could be fitted into the ordinary school programme. At an imaginary twelve o'clock the visitors proceeded to the shelf at the side of the room and each secured his lunch pail or box. In the meantime other members of the class had spread serviettes on the desks and distributed cups and spoons. The cocoa was then served and the lunch proceeded in rural school fashion. At this time an animated discussion took place as to topics of conversation which a teacher might introduce and make the meal easy and homelike. So delightful was the luncheon and the serving of the hot dish so simple that the inspectors pledged themselves to urge boards everywhere to provide such facilities for the children.

WOMENS' ORGANIZATIONS HELPFUL

This movement, along with other features of the course in household science, has received great impetus from the whole-hearted support of the two great Alberta organizations of rural women, viz., Women's Institutes and United Farm Women. On page 816 of the August number of THE AGRICULTURAL GAZETTE will be found a description of the way in which this work is carried out in one Alberta school. Without doubt this scene could be duplicated in scores of rural schools in this province to-day.

There is in the press just now a bulletin entitled "Rural School Lunches," which will be available early in November. This is intended

as a handbook of instruction as to organization for both teachers and trustees. It is the belief of officials of the Department that if trustees can be made aware of the great value of this hot dish and the simplicity of the equipment required that provision for it will soon become general.

During these years good foundation work is being done in preparing teachers for instruction in household science. When the war is over and more money available for equipment and specialists this subject will without doubt come to its own. Some day it will be possible for young women to elect it as a subject to be carried throughout the high school with as respectable standing as algebra.

BRITISH COLUMBIA

BY JOHN KYLE, ORGANIZER OF INDUSTRIAL AND TECHNICAL EDUCATION

THE term domestic science in British Columbia includes the study of cookery, laundry-work, sewing and knitting.

For installing the equipment necessary to teach such subjects the Council of Public Instruction pay to the Board of School Trustees fifty per cent of the cost of equipment up to a sum not exceeding \$500.

Every instructor must hold a British Columbia instructor's certificate of qualification. Each applicant for this certificate must have had two years' training, hold a satisfactory diploma from one of the recognized training colleges in Canada, the United States, or the United Kingdom, and hold a public school teacher's certificate, or have had other approved professional standing. Every application for a certificate must be accompanied with the usual fee of \$5 and a satisfactory testimonial certifying to the good moral character of the applicant.

Rules relating to domestic science:

1. Where domestic science centres are established, attendance is compulsory and must be continuous throughout the school year.

2. A three years course should be taken in public schools.
3. All courses of work in domestic science must be submitted to the Department of Education for approval.

Diplomas are awarded by the Department of Education to pupils who complete the three years' course in domestic science.

Female candidates for high school entrance examination from schools in which instruction has been given, must hold domestic science diplomas or fulfil departmental requirements as to attendances and work.

The total per capita grant for school teachers is also paid for domestic science teachers, viz.:—

To cities of the 1st class ..	\$ 360
To cities of the 2nd class ..	425
To cities of the 3rd class ..	465
To rural districts	480

In addition to this a supplementary grant of one dollar for every dollar which the salary of the teacher is increased is also paid, but in no case must this supplementary grant to be paid by the Government exceed one hundred dollars.

Owing to teachers coming from varied training schools they adopt

many different methods of attacking the lessons in cookery, but it may well be said that they usually employ those which are more or less scientific in character, and discard methods of a purely empirical nature. Sewing and knitting have made great advancement in recent years, and laundry work has its due share of the time allotted to it.

Household science is taught to the student-teachers attending Normal School in Victoria. The necessity of preparing classroom teachers who can conduct lessons without the assistance of a specialist is understood to be the only method of carrying the household science type of training to rural districts in British Columbia.

There are in this province, 47 centres, 38 instructors, 4,867 pupils from elementary schools, 1,184 pupils from high schools, all engaged in the study of household science and domestic economy.

No summer school for school teachers was held this year, but in former years an extensive course was

arranged in cookery, needlework, sanitation, and hygiene, in order to prepare teachers primarily for the work to be done in rural schools.

A three-year high school course in household science worthy of mention is that organized in King Edward High School, Vancouver. The subjects embrace the following:

Household Science..	Physiology and Hygiene, Dietetics and Cookery. Physics and Chemistry. Dressmaking and Millinery.
Household Art...	Drawing and Design. Art Handicrafts.
English.	Literature. Composition.
Arithmetic	and Simple book-keeping.
	Mensuration. Business forms and usages.
Vocal music and ap-	preciation.
Physical Culture.	

It will be seen from the foregoing that the Education Department of British Columbia today is keenly alive to the importance of effectively training the prospective home-maker.

SCHOOL FAIRS IN 1918

PRINCE EDWARD ISLAND

BY J. E. McLARTY, DIRECTOR RURAL SCIENCE DEPARTMENT, PRINCE OF WALES COLLEGE

DURING the year 1918 School Fairs have registered a marked advance so far as numbers and educational value are concerned. Parents, teachers and pupils are enthusiastic in their praises of the great benefits derived from their successful carrying out. We have endeavored to make the fair day the finale for a season's work. In order to be a contestant at one of these fairs, the pupil must begin in the early spring to plan to produce material for exhibition. With the exception of two classes, namely, grains and fruits, pupils were required to exhibit products which were the direct results of their own labour. In the case of grains, the pupils were required to make the selection from

the standing crop. This in itself we hope will be the beginning of better grain being selected for seeding purposes. Similarly with the fruit, the pupils were required to make the selection from the home orchard.

PROGRESS DURING 1918

The fact that the number of fairs held during 1918 was more than double the number held in 1917 speaks for the increased interest taken in this popular form of rural life teaching. The enthusiasm is so great that in many places local fairs were held with but one school participating in order to lay the foundation for a larger and more successful organization for 1919. Already

many requests have been made by teachers for school fairs to be held in their district during the coming season.

Reports from only 18 of the 30 school fairs have been received. These enable the following report to be made:

Number of pupils enrolled.....	3,213
Number of pupils exhibiting.....	1,903
Estimated number of people in attendance.....	5,410
Number of exhibits.....	6,009
Number of prizes awarded.....	2,355
Value of regular prizes awarded....\$	33,780
Value of special prizes awarded....	12,050

ORGANIZATION

The following from School Circular No. 5 Revised will explain clearly the system followed in organizing:

1. The work shall be radiate from the inspector as a head assisted by the Agricultural Representative when necessary and possible. The teachers of the schools is a fair group shall assist the inspector. After the organization the pupils and teachers shall carry out all details in connection with drawing up a suitable prize list and arranging for any special features in connection with the fair.

2. The organization and management shall be carried out by means of a central committee made up of three pupils from each school.

3. An advisory committee shall consist of one teacher from each school, together with one trustee from each school.

4. The central and advisory committees shall meet before May 1st to elect their officers.

5. The following officers shall be elected: Honorary President, President, one Vice-President from each school, a Secretary, an assistant Secretary and a Treasurer. All offices except those of Honorary President and assistant secretary shall be filled by pupils. A teacher or any ratepayer may be appointed as assistant secretary.

The choosing of centres is left in the hands of the inspector as we feel that he knows the inspectorate better than any one else, and is therefore better able to choose the most suitable centres and make the best arrangement of schools. Inspectors were required to notify the Rural Science Department, Prince of Wales, College, before April 1st the centres at which school fairs were to be held. The

committee in charge of the fair were required to submit a report on their complete organization including a copy of their prize list before June 15th.

ASSISTANCE GIVEN

All school fair centres organized under the conditions as laid down by the Rural Science Department, Prince of Wales College, were given the following assistance.

A representative of the Rural Science Department met with the school fair committee before June 15th to assist with the arranging of a prize list and to give any suggestions possible in regard to the successful carrying out of the fair.

As soon as a copy of the prize list was received at this office, several copies were sent to each school taking part in the school fair so that all pupils were working on a uniform prize list.

All the necessary material consisting of entry tickets, prize tickets, secretary's entry book, exhibitor's badges, officers' badges and printed prize tickets for the sports were supplied to all centres.

ARRANGING OF DATES AND SUPPLYING JUDGES

In order to cover the work involved in the shortest time while the weather was favorable, the school fair centres were arranged in groups of five centres in each. A group of judges consisting of two gentlemen and one lady went along with an inspector and spent a week on school fairs. By this arrangement it was possible to have the work completed within one week.

PRIZE LISTS

Every school fair committee drew up a prize list for their own centre. A suggestive prize list was furnished for their guidance. This committee met early in the year to arrange the prize list so that intending compe-

titors might make arrangements to grow whatever they wished to exhibit.

The prize lists usually contained the following classes: grains, roots, garden vegetables, flowers, fruit, canning, cooking, sewing and knitting, manual training, live stock and poultry, collections, school work, contests and sports. The classes were again divided into the necessary sections. It was strongly impressed upon each committee that the prize list should be limited and made to suit their particular community.

In the class of live stock and poultry were included, calves, pigs and poultry. The calves exhibited came under the rules of the Bankers' Competition, as this organization extended their scope to take in school fairs.

During the spring of 1918 Pig and Poultry Clubs were organized at many centres and consequently under the rules of this class only members of these regularly organized clubs were allowed to compete. This we hope will be an incentive for the organization of more live stock clubs for another year.

THE AWARDING OF PRIZES

The question of the awarding of money prizes is one that is causing considerable discussion. It is strongly felt that the money prize is inducive to considerable dishonesty among the grown ups at our regular exhibitions. When this tendency is prevalent among the grown ups, it is felt that the same will be inculcated among the

children even to a greater degree, encouraged as they no doubt will be by the parents. At a good number of our fairs only prize tickets were given and it is strongly claimed by those in charge that the enthusiasm was just as high and that the educational value was superior to that evidenced at fairs where money prizes were given. The question of money prizes also resolves itself into this question—Is it not better to have all money for prizes go to the school rather than to the individual? This idea no doubt will instil into the pupils' minds the idea of loyalty to the school rather than the selfish spirit of winning for the individual.

SPECIAL FEATURES

Each committee was encouraged to use their initiative in introducing special features. Such features as decorated wagon, decorated automobile and decorated bicycle parades were common. Marching and the singing of patriotic songs by the different schools was also popular. As a number of centres interschool games such as baseball and basketball proved very interesting and exciting.

EDUCATIONAL VALUE

It is admitted by all who have been privileged to attend any of the school fairs that their possibilities for educational purposes are almost unlimited.

NOVA SCOTIA

BY L. A. DEWOLFE, B.A., DIRECTOR, RURAL SCIENCE SCHOOLS

IN Nova Scotia this year 231 schools exhibited the produce of their gardens and their homes. Of these 28 were one-room schools, holding their own local exhibitions. The remaining 203 exhibited at 29 different centres, covering from 4 to 30 schools each.

"Canning" was a strong feature at many of the exhibitions. Lawrence-

town led the province in this line, exhibiting 700 jars of canned fruit and vegetables.

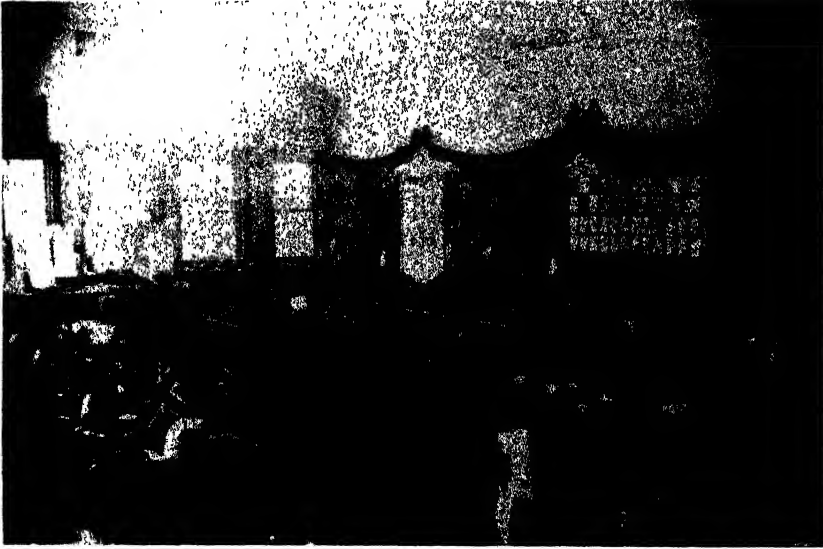
Demonstrations in "Milk Testing" were carried on by the teacher at many exhibitions. To prepare for this work 15 teachers took a special course in Milk Testing at our Summer School in Truro last term.

A new departure so far Nova

Scotia school exhibitions are concerned, was the exhibition at Glace Bay. That town had a four-day exhibition combined with other school activities. It was the biggest affair of its kind yet held in the province. It included children's exhibits of all kinds, singing by the children, com-

brought their material together at large fairs. Those who exhibit locally, however, frequently send the same or similar exhibits to the County Fair.

To show the growing interest in exhibitions it is only necessary to point out that \$2,500 was raised



SCHOOL FAIR EXHIBIT AT WINDSOR, N.S.

petitive school sports and athletics, talks on Agriculture, Band Concert, Cadet March and review, presentation of S.O.S. medals, and graduation exercises of the High School. At the close of the Fair, the children's vegetables were sold by auction.

Winners at small fairs have not

locally for the prize lists. A number of schools raised \$75 each. Smaller schools on the other hand often raised not more than \$5. The Government helped the weaker sections. Approximately 75,000 people saw a school exhibition somewhere in the province.

NEW BRUNSWICK

BY R. P. STEEVES, M.A., DIRECTOR OF ELEMENTARY AGRICULTURE

TWENTY-ONE school fairs were held in New Brunswick last year and were arranged in a circuit commencing at Moncton, September the 2nd, and ending at Petitcodiac on October the 4th.

In almost every locality where a fair was held, the interest, both among children and people, amounted to enthusiasm. Many who had not been in touch with school work since

early youth, attracted by features related to their own occupation, found it pleasant and profitable to spend a few hours in thus giving encouragement to the children. The crowds of citizens who have attended have caused the pupils of the schools to recognize that what they are doing is appreciated, and this union of thought and action, practically expressed between young and mature,

cannot fail to give a deeper purpose to the preparation the schools afford for higher and more resourceful citizenship.

BROADENING INFLUENCE

While the nature study and agriculture part of the school course, through the school garden, with the home plot and poultry project work growing out of the instruction given at the schools, provided the major quantity of the exhibits and formed the basis on which interest was developed, results of other study contributed to broaden the influence exerted. Writing, drawing, composition (essays), pressed plants, collections of seeds and insects, maps, plans of home properties, domestic science, and manual work in wood, all had their place at most of the fairs. Only by consolidating the interweaving practical outdoor application with school-room study, can the great power the school possess as for community building be exerted. The school fair calls the attention of the ratepayers to their school, to its local value and to the importance of the teacher's office. It is a sort of clearing house, an annual summing up of results in a form that can be seen and handled. It trains pupils to put themselves into touch with the things that occupy the time of the people, and thus helps to make the work of education to be the early steps of men's and women's employments.

UNITY MORE MARKED

To a much larger extent than last year, union among districts for school fair work has been effected. In one case, at Sussex, nine districts co-operated, giving the fair the rural and town features in healthy combination. At Chatham, Sackville, Hartland, Hampton, and other places, the same principle was followed. Even in purely rural localities the same plan worked admirably. At

Cambridge five, Young's Cove Road three, and at Jacksonville, two districts united with excellent results. Training among the young of this kind cannot but be beneficial. Knowledge of each other, obtained by actually uniting in educational activity, will conduce to break down local jealousies and sectional feeling and to create union co-operation.

EDUCATIONAL EFFECT

Last year preparation for fair work extended over a longer period of time. Through the winter and spring the fair idea was kept to the front and used as an impelling power to increase interest in regular school work. This also helped to connect with production, knowledge, and instruction. It generally occurs that the best students have the best exhibits, not only of school room work, but of garden products. The scientific side of production is thus emphasized. The complex nature of productive industry is shown to need not only art, the practical, but also science, observation, study and experimentation.

LOCAL JUDGES

Our plan has been to, so far as possible, obtain judges from the localities where fairs are held. We find that by so doing there is a closer connection with resident people. The official in charge with the teachers, acts as interpreter of the prize list, and is always present to aid with his judgment as becomes necessary. Exhibitors are given a number which is placed on each exhibit. No names appear on exhibits. Judges have a record sheet on which they mark the number opposite the prize awarded. From these sheets and the registration paper the amount of prizes awarded each exhibitor is made out.

RESULTS RATHER THAN PRIZES

Prizes are purposely kept small. The feature kept prominent is edu-

cation, not the amount of money to be obtained. To the three making the best showing at each fair, certificates of award are granted. It is suggested that those who receive such certificates have them framed, and that they allow them to be hung in the school room for the remainder of the school year, thus serving as an incentive for further continued effort.

CONTINUATION WORK A NECESSITY

A noteworthy fact in connection with last year's school exhibitions was that in several places—Jacksonville, Andover, Kingston, and Chatham—the Boy's and Girl's Community Clubs Poultry and Live Stock, under the direct charge of Agricultural Department officials, have also made creditable showings. Such

work indicates the trend of thought of the people. There is a period between the time of leaving school and mature age when many young people are lost to the country, through lack of much to interest them. This form of continuation work is much needed, and every encouragement should be given our youthful citizens in the productive industries, to keep them in touch with the schools, and carry on their activities in the communities under the most approved and scientific methods. While the efforts of those of school age can best be carried on through the school as a centre, care and attention should be given that the older boys and girls leaving the school should have their interest in the school maintained by practical forms of continuation work.

ONTARIO

BY R. S. DUNCAN, B. S. A., AGRICULTURAL REPRESENTATIVE SUPERVISOR

THE school fair is one of the best means of arousing interest in the work of the school. It creates in the boy and the girl a greater love for farm work, and is a

gotten a mighty stronghold of the community and is gaining in popularity.

School fairs have registered a marked improvement over former



FOALS AT CENTREVILLE SCHOOL FAIR

big factor in bringing the school work in closer touch with the home life of the pupil. During the past few years the movement has been given a very severe test. It has

years, particularly is this true of the quality of the exhibits. This may be attributed, first, to the pupils' experience in selecting produce for the fair, and, secondly, to an awakened

interest on the part of teachers and parents. A special part of the programme on Fair Day has been set aside for the judges to give reasons for their placing. The desirable type in vegetables and the manner of preparing exhibits were pointed out and emphasized. This had a wonderful effect on the exhibits the following year, the quality being much superior and the arrangement more attractive.

STATISTICS OF THE FAIRS

During the past season 307 fairs were held in the province of Ontario,

Oats.....	O.A.C. No. 72.....	bush.	82½
	Banner.....		12
Barley.....	O.A.C. No. 21.....		57
Wheat.....	Marquis.....		42
Potatoes....	Green Mountain.....		858
	Irish Cobbler.....		482
		lb.	
Field Peas...	Early Britain.....		495
	Arthur.....		450
	Prince Albert.....		30
Garden Peas.	Thomas Laxton.....		756
		packages	
Mangels..	Yellow Leviathan.....		4,240
	Bruce's Giant.....		365
	Our Ideal.....		440
	Yellow Intermediate....		560
	Mammoth Long Red....		125



DAIRY CALVES, ODESSA SCHOOL FAIR

and 2,868 schools were included in the movement, with a total of 71,086 children taking part. This is an average of 9 schools for each fair and 25 pupils for each school. It is estimated 84,338 children and 88,908 adults attended the fairs, making a total of 173,246. The pupils had 66,613 home plots and made entries to the number of 115,531.

The Department of Agriculture purchased and distributed in small packages to the pupils, the following quantities and varieties of seeds:—

Turnips.....	Purple Top Swede.....	725
	Garton's Model.....	800
	Carter's Invicta.....	1,880
	Good Luck.....	430
	Garton's Keepwell.....	125
Beets.....	Detroit Dark Red.....	6,860
Carrots	Chantenay.....	8,120
Onions	Yellow Globe Danvers..	6,910
Parsnips....	Hollow Crown.....	3,920
Asters.....	Giant Comet.....	8,765
Sweet Peas..	Giant Spencer.....	5,165
Phlox.....	Drummondii.....	4,295

Special precautions were taken to purchase the best quality of oats, barley, wheat and potatoes which could be obtained. This tended

towards greater uniformity, and resulted in many farmers getting a start in seed of the highest quality of the best varieties. Agricultural Representatives have been shown whole fields of grain and potatoes which had as their origin the small package of seed distributed to the pupils of the schools during the past few years. The value, therefore, of the school fair work in the distribution of pure seed through the county must be recognized.

The number of eggs of a bred-to-lay strain of utility breeds of poultry

the Poultry Breeding Stations which have been established in each county. The birds in the Breeding Stations are of the bred-to-lay strain and are mated with cockerels secured through the Poultry Department at the Ontario Agricultural College. Each station is inspected and the flock culled in order to eliminate the poor birds. The eggs from these breeding stations are in great demand from farmers in the community, and invariably command a much higher price than the eggs from the average neighbors' flock.



CHILDREN'S CHICKENS, ODESSA SCHOOL FAIR

distributed during the past three years may be summarized as follows:—

	1916	1917	1918
Barred Plymouth Rock	7,357	8,940	9,670
Rhode Island Reds....	406	293	140
White Wyandottes....	295	50	130
Totals.....	8,058	9,283	9,940

A certain number of the eggs distributed were obtained from the Poultry Department of the Agricultural College at Guelph, but the greatest quantity was secured from

52442—5½

CLASSES OF EXHIBITS

The classes of exhibits at the fairs might be summed up as follows:—

1. Products from home plots from seed supplied.
2. Poultry and Live Stock.
3. Collections of nature objects such as mounted weeds, weed seeds and insects—beneficial and injurious.
4. Manual Training and Household Science Work—cooking and sewing.
5. Collections of fruit.
6. Educational work including essays, maps, drawing, writing, art, etc.
7. Miscellaneous and contests of various kinds.

THE DAY'S PROGRAMME

The programme for the day would be somewhat as follows:—

Until 10.30 a.m. Placing of Exhibits; this work to be in charge of Teachers and Directors.

10.30–11 00 a.m. Judging calves, colts, and lambs.

11.00–12.00 a.m. Live Stock Judging Contest and Girls' Knitting and Sewing Contests.

The school fairs have been managed in the past by a Rural School Fair Association composed of representatives from each school with the Agricultural Representative as manager. The pupils get a splendid executive training and they are always ready for the several committee meetings which are held during the season.



FIRST PRIZE WINNER IN LENNOX, ONT., HOME GARDEN, 1918, WITH 99 POINTS

12.00–12.30 a.m. Lunch to be served in picnic style.

12.30–1.00 p.m. Address of Welcome—Public Speaking Contest.

1.00–1.30 p.m. School Parade.

1.30–3.00 p.m. Programme of Sports, Contests and Competitions.

THE PRIZE MONEY

The total prize money for each fair varied from \$40 to \$125, depending upon the number of schools taking part and the generosity of the trustee boards. All prize money is raised locally, the school sections, township and county councils, and public spirited persons, all contributing a share. No admission is charged and no entry fee is received.

DISTRIBUTION OF MATERIAL

Now as to distribution of the material to the pupils. During the past season, the greater part of the seeds and eggs were distributed through the mail by parcel post, or sent by express. In some sections, however, use was made of the motor, which always afforded an opportunity for the Agricultural Representative to visit the school and give a little talk to the pupils on school fair work. The system of sending eggs by parcel post has been endorsed by practically all our representatives. Some four or five reported the hatch not as satisfactory in their county, due no

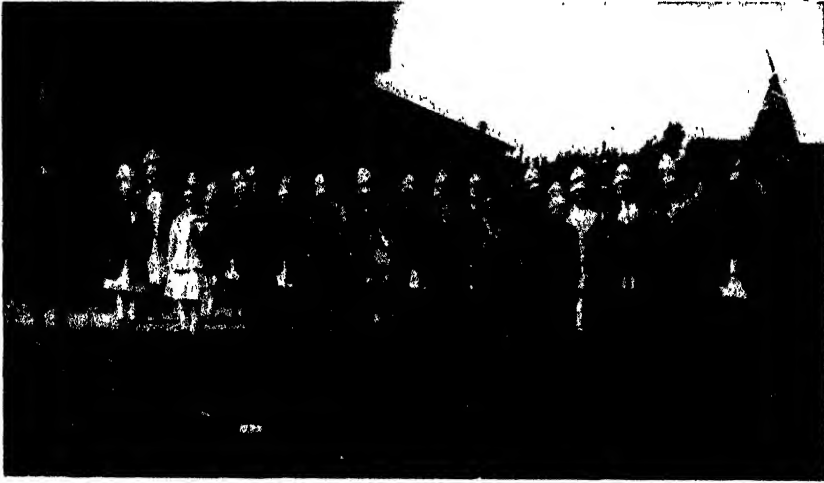
doubt to carelessness in handling by rural mail carriers.

THE PATRIOTIC FUND

"Children's Tag Day" at the fairs this past fall resulted in the sale of

NEW FEATURES

A few new features, particularly in regard to contests on Fair Day, were introduced at some of the fairs attended by the writer. These included a



SCHOOL PARADE, RURAL SCHOOL FAIR, CAYUGA, ONT.

about 60,000 patriotic buttons, with a total of nearly \$2,500 collected for the Rural School Fair Patriotic Fund. This money will be used for some

boys' car-driving contest; a spelling match, using words in relation to agriculture and home economics; a fancy drill; solo and chorus singing



FIRST PRIZE PLOT OF OATS, HALDIMAND COUNTY, ONT.

special and worthy object which will be decided upon at a later date.

competitions; baby contest; boys' carpenter contest; girls' knitting and

sewing competitions, and a Babylonian Health contest. An innovation at one fair was a prize given for the best decorated float that illustrated some phase of agricultural production, food conservation, or similar subject. In the School Parade the float idea was modified somewhat, and pupils

plying score cards giving instructions and finally paying the prizes awarded.

DISTRICT FAIRS

During the past season there were four district school fairs held in the province, where the winners at the



PRIZE-WINNING COLTS AT LAUREL, DUFFERIN CO., ONT., SCHOOL FAIR

were permitted to arrange themselves in any formation which would help depict their subject.

INSPECTION OF THE PLOTS

Inspection of the plots was again discontinued by the Department,

smaller fairs were brought together. These were held in the counties of Oxford and Wentworth and the districts of Algoma and Manitoulin Island. Generally speaking prizes were offered by the Agricultural Society where the fair was held in the central part of the county or



BOYS' DRIVING CONTEST, HAYSVILLE SCHOOL FAIR, WATERLOO CO., ONT.

but in the majority of school fair districts arrangements were made to have this work done voluntarily by someone locally. The trustee board usually made arrangements for some capable person in the locality to do the judging, the Representative sup-

district. The 1st, 2nd, and 3rd prize exhibits from the different school fairs in the county competed at the district fair.

Reports would indicate a great interest was taken in the larger fair and the quality of the exhibits was in

many cases superior to those exhibited at the regular fall fair held by the Agricultural Society. The greatest difficulty in staging a fair of this nature is that most of the school fairs are held at a considerable distance from where the district fair was held, and transportation facilities in some counties are not of the best. The idea of the district fair is to be commended, for it stimulates the boys and girls to do their best in caring for their plots, in order to produce the best, and preparing their exhibits for competition, because by taking a prize at the district fair they are winning greater honours than by taking a prize at their local school fairs.

CHAMPIONSHIP JUDGING CONTEST

The special feature of the district fair in Oxford County was the Championship Live Stock Judging Competition, where eight teams of

three boys competed for the honours. The boys showed evidence of having had considerable coaching in all classes of live stock, and the very fact of their competing would give them added interest in the live stock on the home farm. The prize for the winning team was a silver cup and a pure-bred Yorkshire pig to each of the boys. The boys in the second team are to be given one hundred Barred Plymouth Rock eggs for hatching in the spring, and the boys in the third prize team fifty Barred Rock eggs.

LEARNING TO DO BY DOING

The various fall fair boards have set aside a certain sum for special classes at the fairs for children's exhibits. Competition is keen and invariably the plot products surpass those exhibited in the regular classes. The boys and girls have as their motto: "Learn to do by doing."

MANITOBA

BOYS' AND GIRLS' CLUB FAIRS

BY S. T. NEWTON, DIRECTOR, AGRICULTURAL EXTENSION SERVICE

THE first Boys' and Girls' Club fairs were held in Manitoba six years ago, and the best tribute that could be paid to this movement is that the eight communities which held fairs at that time have continued to hold them ever since, and this year's fairs were better than ever. Of the 165 clubs that have been organized since that date, all held successful fairs this year, except four or five whose dates came after October 12th, and had to be postponed indefinitely on account of Spanish influenza.

Owing to harvesting and threshing operations extending right up to winter, it is difficult to find a time for the fairs when the farmers are not busy, and this year, with many of the older members of the clubs doing men's work on the farms, a large number of them were not able to

bring to the fair the result of their summer's spare-time activity.

Most of the fairs were held during the last week of September and the first two weeks of October, and the number of people who took time off from their harvest operations to examine the exhibits was very gratifying, there being no less than 22,000 adults and 28,000 children at the fairs.

FOOD SIDE OF THE WORK

Ever since the war broke out, the food side of club work has been emphasized, consequently the special appeal made last spring for food found the Manitoba boys and girls fully organized for effective work, and the results of the summer's work as shown by the exhibits at the fairs, indicate that few members were idle.

The number of exhibits in the various food classes were as follows:—vegetables, 11,070; poultry, 3,635; pigs, 1,954; calves, 826.

We felt that production without conservation would be a mistake, and vegetable canning was emphasized throughout the past year, with the result that over three thousand club members had exhibits at the fairs, and close on five thousand had splendid exhibits of good, plain home cooking.

Canadian Bankers' Association, the Dominion Department of Agriculture, and the Manitoba Swine Breeders' Association, resulted in some rather remarkable results. One boy, Edgar Van Wyck of Roland, raised two pigs which were six and a half months old on the day of the fair, and tipped the scales at 670 pounds. The second best pair was raised by Donald Dalglish of Grandview, and weighed 600 pounds. Another pair raised by Stanley Hocken of Brook-



JUDGING CALVES, DAUPHIN, MAN., BOYS' AND GIRLS' CLUB FAIR

PRODUCTION OF REGISTERED SEED

Owing to the fact that Manitoba holds a large number of community seed grain fairs, and an extensive provincial soil products exhibition, many boys, and some of the girls, have been very much interested in growing registered seed, and over 500 exhibited sheaf and threshed grain at the fairs, and the best exhibits will be brought together at the soil products exhibition for provincial honours.

PRIZE PIGS

The interest taken in the pig and calf raising competitions by the

dale weighed 627 pounds, but they were eight months old. Thirty club members raised pairs of pigs weighing more than 500 pounds, and ninety-two had pairs that went over 400 pounds on the day of the fair.

The places having the largest showing of pigs were—Dauphin 108, Virden 60, Grandview 54, Brooklands 54, Portage 52, Brandon 42, St. Rose du Lac 40, Oak Lake 36, and Roland 58.

DIVERSIFIED EXHIBITS

Not all the contests applied to food. There were 17,000 exhibits of school work, 6,162 exhibits of

sewing, 815 dairy exhibits, 1,148 of woodworking, and 887 weed exhibits.

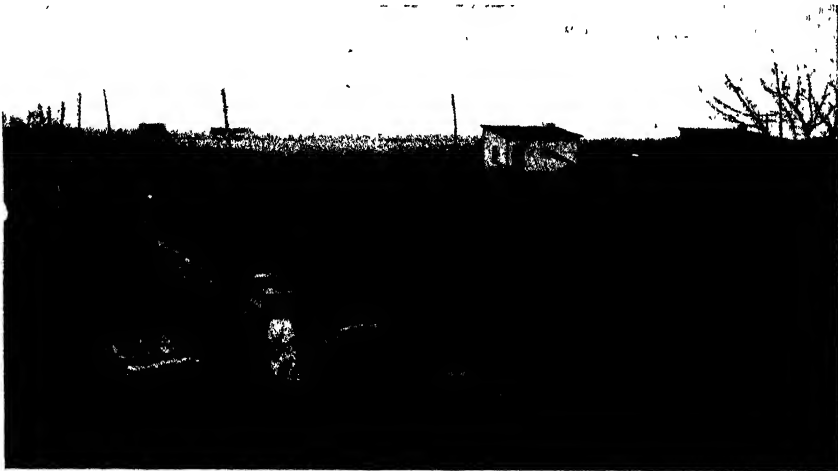
In a membership of 25,000 there is naturally a wide diversity of tastes. For this reason, twelve contests are included, so that there will be something to interest everyone. However, club members are not encouraged to take more than four contests.

In a few inspectoral divisions where there are medium-sized clubs, the prize-winning exhibits are brought to a central town for sweepstakes honours, and for the Rockwood

club member making the highest score where they have branches.

Needless to say, the competition for these 100 free trips was very keen. The winners were to have left for Winnipeg on November 11th, but the trip has been postponed on account of the influenza until February 17th, when it is hoped that a whole week will be spent in instruction and sight-seeing at the college.

To encourage vegetable canning, the winners at six summer agricultural fairs competed at the Winnipeg garden show in September, their



SOME OF THE 72 PIGS SHOWN AT DAUPHIN, MAN., SCHOOL FAIR

district, even last year, a special train was run to accommodate the young people.

FREE TRIPS TO THE AGRICULTURAL COLLEGE

As a further encouragement to the children to produce food, a leading firm offered a free trip to the Agricultural College for the boy or girl who obtained the highest score in certain contests in each inspectoral division. The Manitoba Swine Breeders' Association offered a similar trip for the winners in the pig raising contest, and the Canadian Bank of Commerce and the Merchants Bank gave free trips for the

travelling and living expenses being paid by the Department of Agriculture.

ASSISTANCE GIVEN

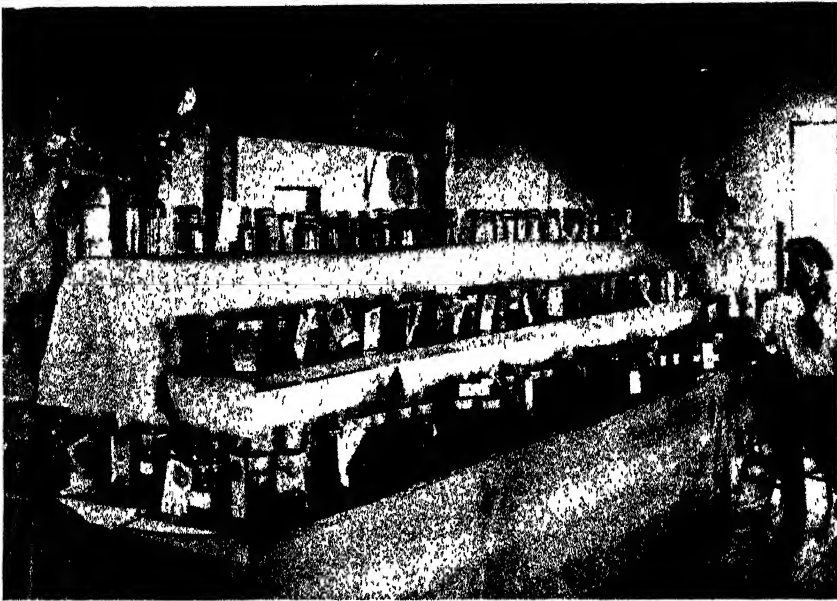
It would be difficult to enumerate all the resources from which assistance is given to Boys' and Girls' Clubs, but we will give a few:—

1. *Financial*—Funds for seeds, prizes, etc., are generally provided by the various school trustee boards. In some municipalities the municipal council gives a grant sufficiently large to cover the expenses of all the clubs in the municipality. The Department of Agriculture pays one-third of the amount of money actual-

ly paid out in cash prizes, and, in addition, a little over one-half in the purchase price of seeds and eggs.

2. *Personal assistance*—Possibly the school inspector has devoted more time to club work than anyone else, as, in addition to organizing the branch and central clubs in his division, he was present at all of the fairs and took a very active part in directing the energies of the young people. At several centres the bank

In all club work the parents have taken a deep interest, and encouraged the children by assisting them to get the best kind of stock, and, better still, by permitting their boys and girls to actually own the pigs, or calves, or chickens, which they were caring for. In fact, not less than 90 per cent of the exhibits at the fairs were actually owned by the children who exhibited them. Where children did not have the money to buy



CANNED VEGETABLE EXHIBIT AT DAUPHIN, MAN., BOYS' AND GIRLS' CLUB FAIR

managers were active in helping along the work of the club. The Agricultural Representative was also an important factor, as were also hundreds of teachers, and scores of business men and women.

The Extension Service provided judges for all of the fairs, and assisted the teachers and inspectors in organizing new clubs. Two-thirds of the entire Agricultural College staff devoted all their time to club work during the three weeks that the fairs were being held.

the calf or pig outright, the bank, or some other agency, loaned them money. The Winnipeg Rotary Club alone financed 50 children in buying pigs.

If we were asked to name the one feature that will do most to make Boys' and Girls' Club work a success, we would have no hesitation in saying, "let the boy or girl actually own the pig, or calf, or chickens, that he or she is caring for throughout the summer".

A SAMPLE SCHOOL FAIR

BY CHAS. MURRAY, B.S.A, AGRICULTURAL REPRESENTATIVE, DAUPHIN

THE third annual fair of the Dauphin Boys' and Girls' Club was held in the Agricultural Fair Grounds on October 4th. Despite the fact that many of the farmers were busy threshing, which prevented fully one-third of the children attending with their exhibits,

Woodworking	2
Booklets and Essays.....	2
Total.....	600
School Work (est.).....	200

The pig raising, calf raising, poultry, gardening, and canning contests were specially worthy of comment,



CHAMPION CANNING TEAMS FROM GLADSTONE, DAUPHIN, TEULON, PORTAGE LA PRAIRIE, AND CHARLESWOOD, MANITOBA

there was a very satisfactory showing, as the following figures show:

Number of schools represented....	16
Number of Exhibitors.....	223

The number of exhibits were in:

Pig raising.....	36
Calf raising.....	12
Poultry	72
Grain Growing.....	2
Cooking.....	91
Gardening.....	203
Sewing.....	70
Canning.....	80
Noxious Weeds.....	13
Dairying.....	17

although in virtually all the contests there was strong competition.

Spendid assistance was given the club executive by the ladies of La Verendrye Chapter I.O.D.E., who decorated the hall and served a hot luncheon; and also to the Home Economics Society, who took charge of the canning, cooking, sewing, and baking contests. In spite of the unfavourable weather there was a large attendance—upwards of 1,200—at the fair and the greatest enthusiasm was everywhere manifested.

SASKATCHEWAN

BY A. H. MCDERMOTT, DIRECTOR OF SCHOOL AGRICULTURE, REGINA

THE Department of Education this year required each school fair executive to report showing registration of each teacher present, number of pupils and exhibits, financial statement, and nature of evening, or other, entertainment, if such were held. These have been found useful and necessary in tabulating and noting progress of the movement, which is comparatively new in this province. The Department does not withhold grants to districts where schools are closed on the day of a school fair if the teacher is registered as attending. To date seventy reports have been returned showing an attendance of 432 teachers and upwards of 17,800 pupils, parents, and others.

THE PROGRAMME

Well-balanced programmes were arranged in most places. The exhibits were largely school-garden products and class-room work. In many cases stock entered in the Canadian Bankers' Associations competition, or other local stock or poultry competitions and club work were most interesting features. A long list of sports was run off while judging was being done or later in the day. An afternoon or evening entertainment with lantern lectures public speaking contests, presentation of prizes or medals, or addresses by prominent educationalists, completed the programme.

It seems regrettable that money prizes should be so frequently offered, and, till such time as this can be corrected, it presents a difficulty met in various ways by organizations. Among the devices for raising funds were: a ten dollar fee for each school room of that district competing, to be

paid by the board of that district, an entry fee for each exhibitor, a fee for each teacher in the association, or even an admission fee charged each non-exhibitor entering the fair grounds. The last of these should be entirely prohibited.

In some cases a central fair was held for competition in prize exhibits at fairs held previously in other parts of the inspectorate. These were doubly valuable and stimulating, since they were held at the same time and place as the teachers' convention.

In the southern part of the province, several live stock judging competitions proved most successful with boys and girls. This feature, it is hoped, will be enlarged and developed in other exhibitions. As time goes on the need for reliable educational judging on a standard basis becomes necessary.

THE TEACHERS' PART

Unfortunately much of the work is done by a few teachers, or the members of the executive of the Rural Education Association, under whose auspices most fairs are held. This may be expected in initial stages of the work.

Owing to frequent changes of teachers, and hence tardiness in planning, much of the preparation is done during the last few days just preceding the fair, whereas it should represent the best of the year's work, which would necessitate a correlation of studies, the secret of successful teaching.

Without exception a very live active interest was taken in school fairs by those concerned, and already plans are being laid for improvement on last year's work.

ALBERTA

BY J. MCCAIG, M.A., EDITOR OF AGRICULTURAL PUBLICATIONS

THE school fair work made some progress in Alberta last year, although it did not reach a great magnitude. The Agricultural Representatives of the Department who have the school fair work in hand, were pressed into service in behalf of greater production, and the school fair work was not very greatly forwarded. The movement is growing rapidly, however, on its own merits. The school fairs are popular, and their good is recognized by the general public, and particularly by the children themselves, who take a great deal of natural pleasure in doing practical tasks under competition. Fairs have been operated for only three years in the province. The growth is shown by the following table:

	No. of fairs.	Schools.
1916.....	6	85
1917.	9	157
1918,.....	15	241

Those who have been engaged in the work from the beginning report great improvement in the fairs in every particular. The exhibits are better prepared, and teachers are aiding to a greater extent in the operations of the pupils. The seriousness of the work is intensifying, both on the side of pupils and parents, and the attendance at the fairs is increasing. More live stock features are being included. Besides the calves, colts, and chickens previously included in the prize list, the work of pig clubs is made to culminate in the school fair, though the pig clubs are rather differently organized and financed. The pupils are handling their stock much better than they did before, and encouragement is given them to bring their stock forward at the Cal-

gary and Edmonton winter and spring exhibitions, after having shown it at the school fairs earlier in the season. The programme of sports is being better arranged and elaborated than formerly.

SEPARATE FAIRS FAVOURED

At five out of the fifteen this year, the school fairs were held at the same time as regular district fairs. The weight of opinion among the managers appears to be favourable to the separate fairs. It appears to be impossible to get the school exhibits set up on the first morning and judged and open for inspection that day. The farmers have not time to make two journeys to town with exhibits, but if the school fair and general district fair both come on the second day, there is not enough leisure for adults to see the school fair properly and the carnival features of the district fair draw the the children away from the school fair. An effort was made last year to secure a good deal of the special prize money of local contributors from farmers' organizations, as the fairs are held wholly for country pupils. The Women's Institutes and United Farmers are giving help in some cases. A good many merchants give special prizes besides. The provincial Government contributed \$1,200 in prizes among the fairs.

EXHIBITS AND ATTENDANCE

Details as to the volume of work and extent of interest connected with the fairs may be gathered from the following figures: there were 1,591 exhibitors, 7,737 exhibits, and 11,000 people in attendance at the fairs.

NOVA SCOTIA

LOCAL "NATURE" OBSERVATIONS

THE Department of Education of the Province of Nova Scotia, with a view to aiding teachers to interest their pupils in observing the times of the regular procession of natural phenomena each season, supplies a leaflet to the public school teachers throughout the province. This sheet provides a list of the wild flowers of the province, the cultivated garden plants, the major farming operations, the meteorological phenomena and a list of the migratory birds. Spaces are provided for the recording of the dates of the first leafing, flowering and fruiting of plants and trees; the first appearance in the locality of birds migrating north in spring or south in autumn, etc. The leaflet makes the following observations:

Teachers will find it one of the most convenient means for the stimulation of pupils in observing all natural phenomena when going to and from the school, and some pupils radiate as far as two miles from the school room. The "nature study" under these conditions would thus be undertaken at the most convenient time, without encroaching on school hours; while on the other hand it will tend to break up the monotony of school travel, fill an idle or wearisome walk with interest, and be one of the most valuable forms of educational

discipline. The eyes of a whole school daily passing over the school routes will let very little escape notice, especially if the first observer of each annually recurring phenomenon receives credit as the first observer of it for the year. The observations will be accurate, as the facts must be demonstrated by the most undoubted evidence, such as the bringing of the specimens to the school when possible.

To all observers the following most important, most essential principle of recording is emphasized: Better *no date*, NO RECORD, than a WRONG ONE or a DOUBTFUL one. Sports out of season due to very local conditions not common to at least a small field, should not be recorded except parenthetically. The date to be recorded for the purposes of compilation with those of other localities should be the *first* of the *many* of its kind following immediately after it. For instance, a butterfly emerging from its chrysalis in a sheltered cranny by a southern window in January would not be an indication of the general climate, but of the peculiarly heated nook in which the chrysalis was sheltered; nor would a flower in a semi-artificial, warm shelter, give the date required. When these sports out of season occur, they may also be recorded, but within a parenthesis to indicate the peculiarity of some of the conditions affecting their early appearance.

The teachers are required to send these sheets to the Inspector with the school returns in July and February, containing the observations made during the Spring (January to June) and the fall (July to December) respectively.

ONTARIO

JUDGING HOME GARDENS IN WENTWORTH CO.

THE Agricultural Representatives for Wentworth county in co-operation with the educational authorities carried out a satisfactory scheme for judging home garden plots throughout the county. Each board of trustees was asked to appoint one or more judges for each particular section. Twenty-eight schools appointed these judges. The Agricultural Representative supplied the judges with a book containing

thirty score cards in duplicate. Instructions were sent with the books. After the judging was completed, and the cards filled in, one card was returned to the Agricultural Representative's office, and the duplicate to the teacher. Each child was given a certificate from the Department of Agriculture, showing the total score made by his garden, and also the grade which his plot was given. Plots that scored over ninety points were

given Grade A certificates; those scoring between eighty and ninety points received Grade B. certificates, and those less than eighty points Grade C. certificates.

SCHOOL DENTAL CLINIC

THE Agricultural Representative and the Women's Institute for Peel County, Ontario, in co-operation with the School Board and the Ontario Dental Society, have organized a system of dental clinics in the Streetsville school. The work was organized at a meeting held at Streetsville on November 28th, that was addressed by the leading men of the district. The teeth of the children are inspected by local dentists and cleaned free of charge. Pupils having teeth needing filling, or other professional attention, are charged a nominal fee. When the teeth are

inspected a card is marked for each of those requiring further treatment that has to be signed by the parents and returned before further attention is given. The local Women's Institute makes the arrangements and takes care of the fees. Mr. Stark, the Agricultural Representative, hopes to have the system of dental clinics extended to other schools in the county.

This new activity is but further evidence of the extremely varied character of the work undertaken by the Agricultural Representatives.

MANITOBA

BOYS' CALF-FEEDING COMPETITION

AT the Manitoba Winter Fair, \$1,250, besides special prizes, will be offered for the boys' calf and steer feeding competition, open to boys resident in Canada over nine years of age and under seventeen, exhibiting steers or heifers calved in 1918. The money will be divided into twenty-four prizes, ranging from \$150 down to \$10. Specials are offered by several breed societies. A continuation class is arranged for

steers calved in 1917, and entries are limited to boys who had entries in the boys' fat calf competitions in the present and the previous four years. In this class heifers are barred and \$290 in ten prizes is given for steers calved in 1917. In addition to these cash prizes, in each case the Manitoba Agricultural College offers to the winners of 1st, 2nd, and 3rd prizes one year's tuition at the College free.

The community forum is the meeting of citizens in their schoolhouse for the courteous and orderly discussion of all questions which concern their common welfare. A community may begin with questions in which local interest is manifest, such as good roads, or public health, or the method of raising and spending public funds, or methods of production and transportation of food products. A discussion of these questions will reveal at once the fact that they transcend local limits. A road is built to go somewhere, and it will relate one community to another. Local health conditions can not be maintained without considering other localities, for the causes of local disease frequently lie elsewhere.

By Henry E. Jackson, Special Agent in Community Organization,
U.S. Bureau of Education.

PART IV

Special Contributions, Reports of Agricultural Organizations, Publications, and Notes.

CONFERENCE ON LIVE STOCK FUTURE

A CONFERENCE in the interest of the further development of live stock was held in Ottawa on November 19th and 20th under instruction from the Hon. T. A. Crerar, Minister of Agriculture. The conference was presided over by Dr. J. H. Grisdale, Acting Deputy Minister of Agriculture, and was addressed by the Hon. the Minister, as well as by the Dominion Live Stock Commissioner, Mr. H. S. Arkell, who took a prominent part in the discussion. The personnel of the conference consisted of the members of the Canadian Live Stock Council, the Deputy Minister of Agriculture for Quebec, representatives of the leading meat packing companies in Canada, and representatives of the Federal Department of Agriculture concerned more especially with the live stock industry.

The purpose of the conference was to consider ways and means of securing for the Canadian live stock raiser the advantages of the situation that has arisen from the devastation of the war. Mr. Henry B. Thomson, Chairman of the Food Board, advised the conference that the latest information showed the deficit in live stock in the principal countries of Europe to total upwards of one hundred and fifteen million head.

There was presented for the consideration of the meeting an agenda covering the following points:—

1. How may we secure the maximum business for Canada with the United Kingdom and Europe?

2. How may we best maintain and increase Canada's reputation on the export market in competition with other countries?

3. How may we best develop a sound commercial connection between producer and distributor?

4. How may we best increase and improve marketing facilities in every stage of the business from producer to consumer?

5. How may we best secure the organized support of capital in this enterprise?

6. How may we best obtain the steady, confident and permanent support of the country in general and farmers in particular, to this movement?

7. How may we best obtain maximum and most economical production from the range, forest, and unoccupied lands of this country?

At the conclusion of the conference the following resolutions were presented to the Cabinet with a recommendation by the representatives that each be given a favourable consideration:—

Whereas the war debt of Canada can best be paid off by developing its natural resources, particularly as having reference to the Canadian live stock industry.

And whereas in view of the existing acute shortage of animal products of all kinds in England and European countries to-day, and the certainty that these cannot be replaced for many years, this convention of live stock producers and packers meeting in conference with officials of the Department of Agriculture, resolve;

1. That a policy of rural credit sanctioned and supported by Federal Governments has proven of enormous assistance to agriculture in European countries, and also has recently been adopted by the United States, and that such loans to farmers of Canada would assist greatly in equalizing markets, improving and increasing all herds and flocks, and in the better finishing of meat animals, that the Department of Agriculture be empowered to immediately outline such a system for approval and adoption by this Government.

2. That in view of the demand for agricultural products that exist in France, Belgium, and Italy, the Government take steps to establish credits in Canada for these countries.

3. That with the view of establishing immediate commercial connection in Europe in order to secure maximum business for Canada, the Government at once appoint a representative, preferably Mr. H. B. Thomson, in the continuation of his present capacity, whose business it would be to obtain the fullest possible recognition for Canadian interests in supplying such products.

4. That the Government be requested to provide the necessary marketing facilities

which will make possible the development of a permanent and extensive export trade in chilled beef and other meat and animal products, and that immediate steps be taken in connection with the Government's programme of shipping and railway transportation to provide adequate controlled temperature space in railway cars at the terminal harbor fronts and on ocean-going vessels.

5. That the Government give authority and the necessary financial support to the Department of Agriculture in launching a propaganda throughout Canada, first, for the maintenance and immediate increase of production in live stock, and, second, for a campaign of education for the improvement of the breeds of live stock.

A NATIONAL DAIRY CONFERENCE

A CONFERENCE of representatives of all the different branches of the dairy industry was held in Ottawa, November 25th to 28th, by authority of the Minister of Agriculture, for the purpose of discussing important matters affecting the industry from a national standpoint. The various Associations were asked to name delegates, and these were invited along with others whose official position entitled them to recognition. Mr. J. A. Rudick, Dairy and Cold Storage Commissioner, who organized the Conference, presided at the different sessions.

The Delegates.

The delegates attending were as follows:—

Dairymen's Association Western Ontario:—Jas. Donaldson, Atwood, Frank Boyes, Dorchester, W. G. Medd, R.R. No. 1, Woodham.

Dairymen's Association Eastern Ontario:—J. A. Sanderson, Oxford Station, T. A. Thompson, Almonte, R. G. Leggett, Newboro.

Quebec Dairymen's Association:—J. B. Vincent, Racine, Shefford Co., L. P. Lacoursiere, St. Hyacinthe, J. P. Cox, Greenlay.

New Brunswick Dairymen's Association:—W. H. Hubbard, Norton, J. P. Simmonds, Moncton.

Nova Scotia Dairymen's Association:—D. W. Murray, Scotsburn, Harold Falconer, Stellarton.

Prince Edward Island Dairymen's Association:—J. Walter Jones, Bunbury Farm, Charlottetown, J. F. Profit, Kensington.

Manitoba Dairymen's Association:—Walter J. Cummings, Winnipeg, Alex. MacKay, Winnipeg.

Saskatchewan Dairymen's Association:—W. A. Wilson, Saskatchewan Co-operative Creameries, Regina, O. W. Andreasen, Humboldt.

Alberta Dairymen's Association:—E. T. Love, Manager Woodland Dairy, Edmonton, P. Pallesen, Calgary Central Creamery, Calgary.

British Columbia Dairymen's Association:—S. H. Shannon, Cloverdale, T. A. F. Wiancko, Victoria.

Ontario Milk Producers' Association:—E. H. Stonehouse, Weston.

Milk Shippers' Association: (Quebec)—Jas. Winter, Ormstown.

Holstein Breeders' Association:—J. P. Griffin, Freeman.

Ayrshire Breeders' Association:—W. F. Stephen, Huntingdon.

Jersey Breeders' Association:—Bartley A. Bull, Brampton.

Ice Cream Manufacturers' Association:—J. Bingham, Ottawa Dairy, Ottawa.

Milk Distributors:—C. B. McNaught, City Dairy, Toronto.

Canadian Creamery Association:—Mack Robertson, Belleville, Ont., W. G. Jackson, Simcoe, Ont.

Milk Condensaries:—W. D. Strack, Borden Milk Co., Montreal, J. D. Laing, Brockville, Ont.

Prince Edward Island Department of Agriculture:—Fraser S. Morrow, Dairy Instructor, Charlottetown.

Nova Scotia Department of Agriculture:—W. A. MacKay, Dairy Superintendent, Truro.

New Brunswick Department of Agriculture:—H. W. Coleman, Dairy Superintendent, Sussex.

Quebec Department of Agriculture:—E. Bourbeau, General Inspector for Cheese, St. Hyacinthe.

Ontario Department of Agriculture:—G. A. Putnam, Director Dairy Branch, Toronto.
Manitoba Department of Agriculture:—L. A. Gibson, Dairy Commissioner, Winnipeg.

Saskatchewan Department of Agriculture:—Percy Reed, Dairy Commissioner, Regina.

Alberta Department of Agriculture:—C. Marker, Dairy Commissioner, Calgary.

British Columbia Department of Agriculture:—T. A. F. Wiancko, Dairy Instructor, Victoria.

Chief Dairy Instructors, Ontario and Quebec:—Frank Hens, London, Ont.; G. G. Publow, Kingston, Ont.; Geo. K. Cayer, St. Hyacinthe, Que.

Dairy School Superintendents:—A. T. Charron, St. Hyacinthe, Que.; L. A. Zufelt, Kingston, Ont.; H. H. Dean, Guelph, Ont.; K. G. MacKay, Saskatoon, Sask.; R. W. Brown, Winnipeg, Man.

Montreal Produce Merchants' Association:—E. H. Hodgson, Montreal, P. W. McLagan, Montreal.

Official Butter Grader for Ontario:—J. H. Scott, Municipal Abattoir, Toronto.

Macdonald College:—Dr. F. C. Harrison, Principal.

Ontario Agricultural College:—Prof. T. H. Lund, Bacteriologist.

Quebec Agricultural Co-operative Society:—A. Trudel, 63 William St., Montreal.

Department Trade and Commerce, Ottawa:—Dr. A. McGill, Dominion Analyst.

Officials of the Department of Agriculture, Ottawa:—Dr. F. T. Shutt, Dominion Chemist; Dr. F. Torrance, Veterinary Director General; J. A. Ruddick, Dairy and Cold Storage Commissioner; Geo. H. Barr, Chief, Dairy Division; J. F. Singleton, Chief Inspector, Dairy Products; Jos. Burgess, Chief Inspector, Dairy Produce Commission; J. G. Bouchard, Inspector, Dairy Products; Harvey Mitchell, Representative Dairy Branch, Maritime Provinces.

Subjects Discussed.

The discussions covered the following among other subjects:—

Legal Standards for Milk and its Products.
Commercial Grades, and the Grading of Dairy Products.

Dairy Organization—Local and National.
The Pasteurization of Cream for Butter-making.

The Compulsory Pasteurization of Dairy By-products.

In the discussion of these subjects the Conference had the assistance of Dr. A. McGill, Dominion Analyst; Dr. F. T. Shutt, Dominion Chemist; Dr. F. Torrance, Veterinary Director-General; Mr. T. H. Lund, Bacteriologist, Ontario Agricultural College

and Mr. W. D. Strack, Chemist for the Borden Milk Co.

RESOLUTIONS.

After a full discussion, and consideration in committee, the following resolutions were adopted:—

LEGAL STANDARDS. MILK AND ITS PRODUCTS.

After a general discussion the matter was referred to a special committee for consideration. This committee recommended, and the Conference approved, of the following standards:

1. *Milk*, unless otherwise specified, is the fresh, clean product, obtained by the complete, uninterrupted milking, under proper sanitary conditions, of one or more healthy cows, properly fed and kept, excluding that obtained within two weeks before and one week after calving, and contains not less than three and one-quarter (3.25) per cent of milk fat, and not less than eleven and three-quarters (11.75) per cent of total milk solids, and must contain nothing foreign to natural milk.

2. *Skim milk* is milk from which a part or all of the cream has been removed, and contains not less than eight and one-half (8.5) per cent of non-fat milk solids.

3. *Pasteurized milk* is milk that has been heated to a temperature of one hundred and forty (140) degrees Fahrenheit to one hundred and forty-five (145) degrees Fahrenheit, and held at this temperature under agitation for a period of twenty (20) to thirty (30) minutes, and immediately cooled to forty-five (45) degrees Fahrenheit or lower, and shall be at a temperature not above fifty-five (55) degrees Fahrenheit when delivered to the consumer, at which time it shall not contain more than one hundred thousand (100,000) bacteria per cubic centimetre.

4. *Sterilized milk* is non-concentrated milk that has been heated to the temperature of boiling water or higher for a length of time sufficient to kill all organisms present, and must be delivered to the consumer in a sterile condition and shall not contain less than three and one-quarter (3.25) per cent of milk fat and eleven and three-quarters (11.75) per cent of total milk solids. Sterilized milk shall not be sold or offered for sale except in hermetically closed containers bearing the words "This milk should be used within twelve (12) hours after opening the containers".

5. *Certified milk*. Milk sold as certified milk shall comply with the following requirements:

(a) It shall be taken from cows semi-annually subjected to the tuberculin test, and found without reaction.

(b) It shall contain not more than 10,000 bacteria per cubic centimetre from June to September; and not more than 5,000 bacteria per cubic centimetre from October to May, inclusive.

(c) It shall be free from blood, pus, or disease producing organisms.

(d) It shall be free from disagreeable odour or taste.

(e) It shall have undergone no pasteurization or sterilization, and be free from chemical preservatives.

(f) It shall have been cooled to 45 degrees Fahrenheit within half an hour after milking, and kept at that temperature until delivered to the consumer.

(g) It shall contain 12 to 13 per cent of milk solids of which at least 3.5 per cent is fat.

(h) It shall be from a farm whose herd is inspected monthly by a veterinarian, and whose employees are examined monthly by a physician.

6. *Evaporated milk* is milk from which a portion of the water has been evaporated, and contains not less than twenty-five and one-half (25 1/2) per cent of milk solids, and not less than seven and eight-tenths (7 8/10) per cent of milk fat.

7. *Sweetened condensed milk* is milk from which a portion of the water has been evaporated, and to which sugar has been added. It contains not less than twenty-eight (28) per cent of milk solids and not less than eight (8) per cent of milk fat.

8. *Evaporated skim milk, concentrated skim milk, condensed skim milk*, is skim milk from which a considerable portion of water has been evaporated, and contains not less than twenty (20) per cent of milk solids.

8A. *Sweetened condensed milk, sweetened concentrated skim milk, sweetened evaporated skim milk*, is skim milk from which a considerable portion of water has been evaporated, and to which sugar has been added, and contains not less than twenty-five (25) per cent of milk solids.

9. *Buttermilk* is the product that remains when butter is separated from ripened or unripened cream, by the usual churning processes; or a similar product made by the appropriate treatment of skimmed milk.

10. *Goat's milk, ewe's milk, etc.*, are the fresh, clean, lacteal secretions, free from colostrum, obtained by the complete milking of healthy animals other than cows, properly fed and kept, and conform in name to the species of animals from which they are obtained.

Cream.

1. *Cream* is that portion of milk, rich in milk fat, which rises to the surface of milk on standing, or is separated from it by centrifugal force, is fresh and clean, and contains (unless otherwise specified) not less than eighteen (18) per cent of milk fat.

2. *When guaranteed* to contain another percentage of milk fat than eighteen (18), it must conform to such guarantee.

3. *Cream* must be entirely free from gelatine, sucrate of lime, gums, or other substances added with a view to give density, consistency or apparent thickness to the article.

4. *Cream* must contain no preservatives of any kind, nor any colouring matter, other than is natural to milk.

5. *Evaporated cream, clotted cream, condensed cream*, or any other preparation purporting to be a special cream, except ice-cream, must conform to the definition of cream, and must contain at least twenty-five (25) per cent of milk fat.

6. *Homogenized cream* is a dairy product resulting from the use of a machine known as a homogenizer, and contains (unless otherwise specified) not less than eighteen (18) per cent of milk fat.

Milk Fat or Butter Fat.

1. *Milk fat, butter fat*, is the fat of milk and has a Reichert-Meissl number not less than twenty-four (24) and a specific gravity not less than 0.905 (40°C)

(40°C)

Butter.

1. *Butter* is the clean, non-rancid product made by gathering in any manner the fat of fresh or ripened milk or cream into a mass, which also contains a small portion of the other milk constituents, with or without salt, and contains not less than eighty (80) per cent of milk fat, and not more than sixteen (16) per cent of water. Butter may also contain added colouring matter of harmless character.

Cheese.

1. *Cheese* is the sound, solid, and ripened product made from milk or cream by coagulating the casein thereof with rennet or pepsin, with or without the addition of ripening ferments and seasoning, and contains, in the water free substance, not less than forty-five (45) per cent of milk fat. Cheese may also contain added colouring matter of harmless character.

2. *Skim milk cheese* is the sound, solid and ripened product made from or by the use of milk commonly known as skim milk, or milk from which any cream has been removed, or milk to which skim milk has been added; or cheese containing in the water-free substance less than forty-five (45) per cent of milk fat.

3. *Goat's milk cheese, ewe's milk cheese, etc.*, are the sound ripened products made from the milks of the animals specified, by coagulating the casein thereof with rennet or pepsin, with or without the addition of ferments and seasoning.

Ice Cream.

1. Ice cream is a frozen, sweetened, dairy product, with or without harmless flavouring and colouring matter, with or without gelatine, gum tragacanth, or other harmless stiffening materials, in amount less than two (2) per cent; and contains not less than seven (7) per cent of milk fat.

Miscellaneous Milk Products.

1. *Whey* is the product remaining after the removal of fat and casein from milk in the process of cheese-making.

2. *Kumiss* is the product made by the alcoholic fermentation of mare's milk or cow's milk.

3. *Milk powder* is the soluble powder product made from milk and contains (unless otherwise specified) not less than ninety-five (95) per cent of milk solids, and not less than twenty-six (26) per cent of milk fat.

4. *Skim milk powder* is the soluble powder product made from skim milk, and contains not less than ninety-five (95) per cent of milk solids.

Recommendations.

1. Your committee recommends that the Dairy Branch of the Dominion Department of Agriculture obtain analytical data of dairy products manufactured and sold throughout Canada with a view to its use in future revision of dairy standards.

2. Your committee recommends that the Federal standards for dairy products be recognized and adopted by all Canadian municipalities which are engaged in the work of food inspection.

COMMERCIAL GRADES AND GRADING OF DAIRY PRODUCE.

After a general discussion on the subject of commercial grades and grading of dairy produce, the matter was referred to a special committee. This committee recommended, and the Conference approved, of the following grades, standards, and definitions:

Whereas there is a lack of uniformity in the scoring of butter and cheese throughout Canada, and

Whereas the adoption of uniform score cards and certificates would benefit the dairy industry,

Be it therefore resolved that the following score cards and grade standards be adopted for general use throughout Canada, and that all score cards of this form bear the heading, Canadian Score Card for Butter, or Cheese, respectively:

Scale of Points for Scoring Cheese.

(1) Flavour—	(2) Texture—	(3) Closeness
45	25	15
Acidy	Stiff	Loose
Fruity	Corky	Ragged
Rancid	Mealy	holes
Tainted	Coarse	Gas or pin
Cow	Weak	holes
Weedy	Lumpy	Swiss holes
Bitter	Pasty	
Gassy		
Heated		
(4) Colour—	(5) Finish—	
10	5	
Streaky	Rough edges	
Wavy	Crooked ends	
Mottled	Soft rinds	
Acid cut	Mouldy	
High	Dirty	
Light	Box	
Total 100 points.		

Grades for Cheese.

Special Grade—Score 94 to 100 points. Minimum for flavour 41 points.

First Grade—Score 92 and under 94 points. Minimum for flavour 39 points.

Second Grade—Score 87 and under 92 points. Minimum for flavour 37 points.

Off Grades—Score under 87 points and under 37 points for flavour.

Standards for Grading Cheese.**Special Grade**

Flavour—Clean, sound and pure.

Texture—Close, firm and silky.

Colour—Good and uniform.

Finish—Even in size, smoothly finished, sound and clean surfaces, straight and square.

Boxes—Strong, clean, well made and close fitting. If made of wood the ends to be of seasoned timber. Weights stencilled or marked with rubber stamp.

First Grade

Flavour—Not quite clean.

Texture—Slightly weak or open.

Colour—Uniform.

Finish—Fairly even in size, well finished, sound surfaces.

Boxes—Strong, clean, well made and close fitting. If made of wood the ends to be of seasoned timber. Weights stencilled or marked with rubber stamp.

Second Grade

Flavour—"Fruity," not clean, "turnipy," or other objectionable flavour.

Texture—Weak, open, loose, "acid," too soft, too dry.

Colour—Uneven, mottled, or objectionable shade.

Finish—Very uneven in size, showing rough corners, black mould, dirty or cracked surfaces, soft rinds.

Boxes—Too large in diameter; top edge of box more than $\frac{1}{2}$ an inch below the top of the cheese. Made of light material. Ends made of improperly seasoned material.

Off Grades

Flavour—Rancid, badly "off," anything inferior to second grade.

Texture—Very weak, very open, showing pin holes, or porous, very "acidic," very soft or very dry.

Colour—Badly mottled, or very objectionable shade.

Finish—Anything worse than second grade.

Boxes—No question of boxes sufficient to make off grade if other qualities are good.

Scale of Points for Scoring Butter.

(1) Flavour— 45	(2) Texture— 15	(3) Incorporation of moisture—10
Flat	Weak	Leaky
Heated	Salvy	Free
Weedy	Greasy	moisture
Sour	Brittle	Milky
Stale	Over-worked	brine
Metallic		

(4) Colour — 10	(5) Salting— 10	(6) Packing 10
Too light	Too light	Poorly packed
Too high	Too heavy	Poorly printed
Uneven	Undissolved	Poorly wrapped
		Poorly nailed
		Poorly finished
		Dirty

Total 100 Points.

Grades for Butter.

Special Grade—Score 94 to 100 points.

Minimum for flavour 41 points.

First Grade—Score 92 and under 94 points.

Minimum for flavour 39 points.

Second Grade—Score 87 and under 92 points. Minimum for flavour 37 points.

Off Grade—Score under 87 points and under 37 points for flavour.

The Committee recommends that official grade certificates shall be issued only on butter made from effectively pasteurized cream.

Standards for Grading Butter.

In order that creamery butter may qualify for "Special" grade certificates, it must have been made from pasteurized cream, and otherwise closely conform to the following description, which represents in a general way the requirements of the export, or best, Canadian, markets.

Flavour—Fine, sweet, mild and clean.

Texture—Firm and fine.

Incorporation of moisture—Clear, but not excessive free moisture.

Colour—Uniform and of a pale straw shade.

Salting—Not more than 3 per cent and thoroughly incorporated.

Grade Standards and Grade Descriptions of Cream.

Table Cream

This grade shall include any lot of sweet, clean, flavoured cream bought for re-sale for household use. The acidity of this cream shall not be more than 18% at the time of grading. The term "Table Cream" may be supplemented by the terms "Inspected" or "Extra Special" as the initial purchaser may in each case uniformly adopt.

Cream for Buttermaking.

Special Grade

This grade shall include any lots of cream which is fresh and clean in flavour, of a uniform consistency, and fit for making into special grade butter. The acidity of cream in this grade shall be not more than .3% (three-tenths of one per cent) at the time of being graded at the creamery where it is to be manufactured into butter.

First Grade

This grade shall include any lot of cream which is reasonably fresh and clean in flavour, of a uniform consistency and fit for making into butter of this grade without the addition of acid neutralizing agents. Its acidity shall not be more than .5% (five-tenths of one per cent) at the time of grading at the creamery where it is to be manufactured into butter.

Second Grade

This grade shall include any lot of cream that does not meet with the requirements specified for the next higher grade; which is bitter, stale, musty, metallic, or otherwise unclean in flavour.

NATIONAL DAIRY COUNCIL.

Whereas the present prosperity of agricultural communities has been largely brought about by the growth of the creamery and cheese making industries;

Be it resolved that in order to safeguard the dairy industry, steps be at once taken to organize a National Dairy Council, and that all dairy organizations represented at this meeting be included in the organization, and also any other dairy organizations that may be formed and are eligible to send representatives to a National Dairy Council.

The special committee to which this resolution was referred brought in the following report.

Your committee beg to recommend that the National Dairy Council be composed of two representatives from each Province, one representative from each Province to be a producer of milk, and that they add to their numbers as follows:

Four representatives of the cheese industry, three from the East and one from the West.

Three representatives of the butter industry, two from the East and one from the West.

Three representatives of the milk distributors, two from the East and one from the West.

Three representatives of the milk and cream producers for city trade, two from the East and one from the West.

Two representatives of the ice cream manufacturers, one from the East and one from the West.

One representative of the condensaries.

And that these thirty-four representatives elect from among themselves a President and a Vice-President, one of whom shall be from the East and the other from the West, and four members of the Executive from Eastern Canada and three members of the Executive from Western Canada.

The Eastern Executive will deal with matters which are of interest to the Eastern district only, and the Western Executive will deal with matters which concern only the Western district. When matters of mutual interest are to be considered both the Eastern and the Western Executives will meet at the same time and communicate by Wire.

PASTEURIZATION OF CREAM FOR BUTTERMILKING.

Whereas bacteria under modern conditions of creamery butter making play so very important a part in determining the flavour of the butter, which is regarded as forming about one-half of its value; and

Whereas pasteurization has been found to be the most practicable means of controlling bacteria and enzymes in milk and cream, thereby improving the flavour and keeping quality of butter; and

Whereas the expense of such pasteurization is not such as to prevent its immediate and general adoption by creamery butter manufacturers;

Resolved that this Dominion Dairy Conference hereby recommends the system known as pasteurization of milk or cream in the manufacture of all butter made in Canada, and urges its adoption at once by all creameries which are not already using this method. The standard temperature recommended is 170 degrees Fahrenheit, holding for 10 minutes.

COMPULSORY PASTEURIZATION OF DAIRY BY-PRODUCTS.

Whereas Tuberculosis of swine is shown by statistics to be increasing from year to year and is now causing serious losses to Canadian farmers; and

Whereas this disease in swine is derived almost entirely from tuberculous cattle, chiefly by feeding the hogs on unpasteurized dairy products;

Be it resolved that the by-products of cheese factories and creameries should be rendered harmless by pasteurization or sterilization before removal from such factories for feeding purposes, and that the Dominion Government be requested to make it compulsory to pasteurize or sterilize all dairy by-products.

DAIRY SIRES.

Whereas the greatest need of the dairy industry in Canada at the present time is the economic production of milk, and as the greatest factor in the economic production of milk is the cow that can produce large quantities of milk and fat, it naturally follows that the greatest problem confronting the dairymen of Canada to-day is how to eliminate the unprofitable or low producing cow from the dairy herds.

It is generally admitted that the sire is the most important factor in building up a dairy herd, and also that better results can be obtained by using a properly pure-bred sire than by using a grade. Two regrettable features about using pure-bred sires are that in many cases it is impossible for purchasers to get any reliable information regarding the milk producing qualities of the dams of the animals offered for sale; and that too many dairymen apparently do not realize the importance or the value of knowing something about the milk producing qualities of the sire's ancestors.

Be it therefore resolved that this Dominion Dairy Conference regrets the fact that many

breeders of pure-bred dairy stock do not keep records of the milk and fat produced by each cow, and are, therefore, unable or unwilling to provide purchasers of pure-bred dairy cattle with this most valuable information, with the result that farmers often purchase pure-bred dairy sires, expecting to improve the milk producing qualities of their herds, but fail to get results because the animals are bred from low milk producing stock.

We, therefore, recommend that a special effort be made by the Dairy Schools, Dairy Instructors, Dairymen's Conventions and other suitable avenues, to place before the milk producers of Canada the importance of buying pure-bred dairy sires from only the breeders who can show reliable records of the milk and fat produced by the dams of the animals offered for sale.

TAKING MILK SAMPLES.

Be it resolved that in future the sample of milk or cream to be tested be divided into three equal portions, each properly sealed, one to be handed to the vendor, one to be tested by the municipality, and the third to be held for testing by an independent authority should occasion require it.

NOTE.—This resolution refers only to milk sold in towns or cities for direct consumption.

MARKET INVESTIGATIONS.

Whereas the creamery industry in Canada has developed to such an extent that there will be a larger surplus of butter available for export in the immediate future, and in order that a product may be exported which will meet with favour in foreign markets and there command the highest market prices, therefore;

Be it resolved that this Conference of Dominion dairymen ask the Dominion Government to appoint a Commission composed of butter experts to investigate the requirements of various export markets and report their findings and recommendations at the earliest possible date.

PAYING FOR MILK BY TEST.

Whereas the payment of milk on the pooling system is an injustice to producers selling milk containing a high percentage of butter fat,

Therefore this Conference places itself on record as favourable to the producer being paid for milk for all purposes of manufacture and for human consumption on the basis of its butter fat content, and further

That the various Provincial Governments be requested to enact such legislation at an early date as will bring such payment of milk into effect.

RELEASING SOLDIERS.

Whereas the war debt of Canada can best be paid off by developing its natural resources, particularly as having reference to the Dairy Industry, and

Whereas in view of the great and increasing demand for dairy products, and

Whereas the Dairy Industry is badly crippled for want of suitable labour, therefore;

Be it resolved that this Conference memorialize the Government, now that Peace is practically declared, to release at the earliest moment possible all soldiers in any way connected with the dairy industry, which includes producers, cheese and butter makers, milk distributors, and others, that they may return to their respective occupations and so be ready when next season opens for a big output of milk and dairy products.

OLEOMARGARINE.

Whereas the federal authorities saw fit to temporarily admit the manufacture and sale in the Dominion of Canada of oleomargarine; and

Whereas the order permitting said manufacture and sale was granted only to relieve food conditions during the present war; and

Whereas an armistice for the consideration of Peace terms is now in force; and

Whereas on the successful conclusion of the war conditions in the Dominion will again become more normal;

Be it therefore resolved that the said order be rescinded, and that the manufacture and sale of oleomargarine within the Dominion of Canada again be declared illegal, and also that no further action will be taken without consulting the National Dairy Council.

THE ONTARIO WINTER FAIR DAIRY TEST

At the annual three-day dairy test carried on at the Ontario Winter Fair at Guelph in December, a pure-bred Holstein cow won the championship award and an Ayrshire 2nd place. The entries included 26 Holsteins, 21 Ayrshires, 13 Jerseys, 4 Shorthorns and 4 grades. The awards were made on the following scale: Twenty-five points for each

pound of fat, 3 points for each pound of solids (not fat), 1 point for each ten days in milk after the first thirty days; limit 10 points. The following table shows the ownership and record of the first prize cows in each class, by ages, as compared with the records made at this show in 1917:

Age, Months	Name	Owner	Results in 1918			Results in 1917		
			Lb. Milk	Per Cent Fat	Total Points	Lb. Milk	Per Cent Fat	Total Points
HOLSTEINS								
48 and over.....	Fayne Segis Pontiac...	Geo. Smith, Port Perry	266.7	3.6	317.635	218.1	3.5	253.814
36 and under 48.	Ruby Fayne De Kol....	M. L. Hayley, Springfield.....	219.1	3.9	271.138	195.7	3.55	228.041
24 and under 36.	Elmwood Daisy Fayne	J. W. Kelly, Hagersville.....	162.5	3.6	191.586	172.7	3.6	205.127
AYRSHIRES								
48 and over....	Pearl of Balquido.....	Harmon Macpherson, Copetown.....	201.8	4.65	290.588	250.6	3.45	282.725
36 and under 48.	Rose of Montrose.....	H. C. Hamill, Markham.....	144.6	4.7	208.618	147.1	4.55	210.077
24 and under 36.	Free Trader's Sarah..	Jno. McKee & Son, Norwich.....	128.3	4.6	184.405	130.2	4.25	175.122
JERSEYS								
48 and over....	Fanny of Edgeley....	Alfred Bagg, Edgeley..	160.0	5.1	252.42	158.4	4.8	239.261
36 and under 48.	Edgeley Daisy Queen..	Jas. Bagg & Sons.....	124.4	5.1	169.924	115.9	5.5	197.622
24 and under 36.	Edgeley Sweet Briar..	Jas. Bagg & Sons.....	103.0	5.2	164.751	108.0	4.7	162.057
SHORTHORNS								
48 and over....	Stanley's Pride.....	S. W. Jackson, Woodstock.....	120.0	4.1	161.27	177.9	3.5	206.992
36 and under 48.	Butterfly Bellona....	S. W. Jackson.....	116.6	4.3	158.781	87.5	3.8	108.587
GRADES								
48 and over....	Tilly.....	Geo. Smith, Port Perry	215.7	3.2	231.437	219.1	4.3	304.425
24 and under 36	Spot.....	Geo. Smith.....	164.5	2.9	164.898	.....	.....	.....

VACANT LOT GARDENING EXPERIENCES

FORT WILLIAM AND THUNDER BAY

BY CHARLES BIRKETT, SECRETARY THUNDER BAY PRODUCTION AND CONSERVATION ASSOCIATION

There has been nothing of a co-operative nature in vacant-lot gardening done in this district outside of the executive work of the Vacant Lot Garden Association of Fort William and the Garden Club of Port Arthur and the Thunder Bay Production and Conservation Association.

In 1915 the first efforts towards increased production were commenced, largely as a measure of relief by committees appointed by the cities, that in Fort William being known as the Vacant Lot Garden Association. The organized distribution of vacant lots—loaned for the purpose by owners—was taken the fullest advantage of by enthusiastic gardeners as well as by those in need of relief. The results were so gratifying as to warrant the taking over of the Vacant Lot Garden Association by a committee of enthusiastic citizens. The same thing occurred in Port Arthur, resulting in the formation of their Garden Club.

deners, whose efforts had hitherto been the subject of the admiration of friends and neighbours alike, now found themselves the centre of a group of inquiries. Nothing could have been more encouraging. The experience of enthusiasts in this climate was at the disposal of the inquirers.

In turn the immense satisfaction of the enthusiast in the realization that his experience could benefit his country became an added stimulus to greater effort. As a consequence the past season saw experiences which five years ago would have raised a smile at the mere mention of them. One man has seed from beans, peas, kale, radish, turnip, carrot, parsnip, and tomato, and but for severe frost would have had parsley, lettuce and beet besides. These were raised in addition to an abundance of other vegetables for canning and storing, so are the result of further, not diverted, effort.

RESULT OF ORGANIZATION

ENCOURAGED BY EARLIER EFFORTS

As a result, the call for increased production in 1917, and 1918 particularly, found a ready response in both of these cities in individual effort. Many enthusiastic gar-

It will be realized from the foregoing that co-operation has been superseded by community enterprise—the only difference being expressed by the word organization. The purchase of seed and fertilizers is governed

by individual requirements, taste, and conditions, as is also the planting and cultivation of the crop. Whilst the climate is a deterrent to gardening, it is also responsible for the almost complete absence of the Colorado beetle and many diseases, so that spraying is rarely necessary. Most garden produce is used at home or supplied to neighbours unable to raise their own. The short season does not allow of much being accomplished in the growing of seed, except by enthusiasts with hotbed or cold frame equipment. A few home gardens grow their own parsnip seed, however.

WORKERS AND ACRES

I might add that the total number of backyard gardens in Fort William is 1,960, covering 127½ acres. The total number of vacant lot gardeners is 1,016, cultivating 194 acres. The total membership of the Fort William Vacant Lot Garden Association is 649. The population of the city is 19,000.

At Port Arthur the total number of backyard gardens is 1,495, covering 78 acres. The total number of vacant lot gardeners is 520, cultivating 116 acres. The total membership of the Garden Club is 981. The population of the city is 16,000.

GALT, ONT.

BY ROBT. S. WILSON, SECRETARY, GALT VACANT LOT ASSOCIATION

Beyond engaging a reliable man to do the ploughing, harrowing and discing, if needed, we indulged very little in what may

either used their own produce or sold it to the corner grocer or, perhaps, directly to neighbours. A number have grown seeds



GIANT SUNFLOWERS IN VACANT LOT GARDEN.

be termed co-operation. We found that the lot-holders preferred to deal directly with the three seed merchants of the city. In other respects we did all we could to encourage each lot-holder to cultivate his own plot. This appeared to us to create greater interest. Quite a lot of spraying was needed, especially as regards the potatoes, but again each lot-holder did his own work, or engaged somebody to do it for him. The results were generally satisfactory and the lot-holders

for the coming year with good success. As a whole we have had a very successful year. Over 600 vacant lots were planted. We are satisfied that the ultimate result will be greater interest among our citizens in gardening. They have come to realize that both health and pleasure can be obtained from cultivating the soil. I would estimate the value of the produce resulting this year as exceeding \$9,000.

NIAGARA FALLS, ONT.

BY H. J. MOORE, QUEEN VICTORIA PARK

In order to stimulate enthusiasm in the production of vegetables, the Niagara Falls Horticultural Society gave as options to

one hundred and thirty of its members twenty-two packets of vegetable seeds to each member, making a total of twenty-eight

hundred and sixty actually distributed. The officers of the society personally weighed out the seeds from bulk. The members called for the seeds at a central distributing point, and saved the expenses of delivery.

One ton of fertilizer was purchased by the Horticultural Society and sold at cost to members and other individuals, which was three and one half cents per pound. A maximum of twenty-five pounds was allowed to each individual. The St. Andrew's Club, The Girl Guides, The Community Gardens, Soldiers of the Welland Canal Force, all of which had organizations as well as the Horticultural Society, took advantage of the distribution of the fertilizer.

PLANTING AND CULTIVATION

The ground was ploughed and harrowed by teams supplied by the City Council, and

during the year 1918 as at many less fortunate points. The spray from the Falls and the humidifying influence of the river were helpful factors in the production of vegetables. Only during a very short period was hose irrigation practiced. In case of a severe drought, the City Council was prepared to supply water to the outlying plots by means of the street sprinkling wagons. Individual plots within the city water limit were, when necessary, watered by means of the hose. Had spraying been necessary to eradicate disease, the Council likewise would have placed a power sprayer at the disposal of the organizations.

GROWING SEED

Individual saving of seed was advocated, as by this means the grower saw that varieties which had produced freely were



VACANT LOT GARDENING—SOME SAMPLES AT PETERBOROUGH, ONT.

prepared to receive the crops. The planting and cultivation was done by members of the organizations, each organization worked its own plot, except in the case of the backyard gardens, which were cultivated by individuals.

SPRAYING AND IRRIGATION

The organizations sprayed their plots where necessary. Except in the case of potatoes, spraying was not essential. Irrigation was not so necessary at Niagara Falls

allowed to seed. Each interested person carefully watched the seeds on the plot arrive at maturity, and carefully collected and stored them away in his or her home. Thus no mixing of varieties occurred and the grower was assured of good seed likely to produce uniform crops.

AREA UNDER CULTIVATION

During the year 1917 the total area under cultivation in the City of Niagara Falls was approximately forty acres. Unfortunately

no actual record was kept of the yield. It was, however, estimated that about nine thousand dollars worth of vegetables were produced. During 1918 with a fairly effective organization under the leadership of the Horticultural Society ninety acres were cultivated. This acreage was composed as follows: Fifteen hundred plots, varying in size from one square rod to one eighth of an acre, but chiefly of a small size, in all about thirty-eight acres cultivated by vacant lot and back-yard gardens; forty acres in larger plots by persons who owned horses or who had facilities for cultivating. Seven acres were devoted to a community garden;

three acres of this was later taken over by the St. Andrew's Club of the Presbyterian Church. A plot of five acres was cultivated by Soldiers of the Welland Canal Protective Force, and one acre, the property of the City Hospital, by the Niagara Falls Girl Guides.

From the forementioned acreage, according to fairly accurate figures based upon forms filled out by growers, an average of three hundred dollars worth of vegetables per acre were produced, valued in the aggregate at \$27,000. The population of the City of Niagara Falls is approximately thirteen thousand.

PETERBOROUGH, ONT.

BY F. H. DOBBIN, ALDERMAN

Peterborough enrolled under the banner of Greater Production, last year, many additional recruits. The well-deserved and

widely read and circulated. The results were at once seen in improved routine and blight. Early spraying was not the rule.



VACANT LOT GARDENING—THE REWARD, PETERBOROUGH, ONT.

earned results of the season of 1917 inspired many others to effort. In all, over 830 plots were selected and cultivated.

As might be expected the results varied with the soil, experience, and efforts of the people cultivating. Early in the year advantage was taken of the offer of the Department to send forward copies of leaflets and publications containing useful information. These leaflets were placed for circulation at convenient stores throughout the city, and were

This defect will be corrected next season.

Roots have been a marvellous success. The moist weather favoured large growth. methods adopted, directly owing to the well-selected information at hand.

In general the crops have been ample. Potatoes in many cases suffered from the Beets, carrots, turnips, etc., grew beyond all records. Tomatoes from the same cause, were comparatively a failure, except in gardens with a favourable southern exposure.

Cabbage seems to have generally escaped the ravages of the pests that pay attention to cabbage and the cauliflower, for the samples of heads raised and shown were certainly very fine. Onions, beans, beets, etc., were favoured.

Last season the back of the potato price-lifter was broken; broken by the efforts of the men and women who took hoes and cultivated, determined that never again would they pay \$5.50 per bag of potatoes.

This season the local demand has been about met, up to, say, the opening months of next spring.

On the whole we have good reason to be contented. While individual cases may have failed to reach high water mark, the larger number have gained substantial results, and have the serene conviction that by self-work the cost of living has been to some extent met.

TORONTO, ONT.

BY GEO. BALDWIN, F.R.H.S., SECRETARY AND SUPERINTENDENT, VACANT-LOT GARDENING ASSOCIATION

For our vacant-lot holders we purchased 14 varieties of vegetable seeds, viz; parsnips, carrots long, carrots short, beets round, beets long, cucumbers, radish, lettuce, swede turnips, squash, beans, corn, onions and nasturtiums, wholesale, and supplied them at cost. In other words, the seeds we supplied at \$2.00 per parcel would have cost the lot holder \$4.11 retail. In the west end of the city we are able to supply free one load of manure to each lot, owing to the kindness of the Union Stock Yards Company donating all the manure we require, gratis, we, of course, arranging for the hauling of the same. In the east end of the city we are unable to procure any manure, consequently the lot-holders are left to their own resources, as it would cost too much to haul from the west to the east. Up till now we have done the ploughing and harrowing free, and everything absolutely free, to

returned soldiers or their dependents, including seeds, our association being kept up by voluntary contributions.

The planting and cultivating are done by the lot-holders. We have supplied 8 sprayers for the whole city; the sprayer being left at a specified place and each district gets it in turn, returning it to the same place again when through. We had 4 garden hydrants installed at different points. Our lot-holders have permission to connect their hose to the nearest house. Our lots are of a size, viz; about 4,000 square feet each. The lot-holders grow just about enough for a family of five, and, with few exceptions, nothing is sold, arrangements for which they make themselves. We had under cultivation in 1918 2,060 gardens, all of which did well, and we estimate the value of our crops at between \$75,000 and \$80,000.

REGINA, SASK.

BY JAMES F. BRYANT, M.A., LL. B., PRESIDENT, REGINA FOOD PRODUCTION ASSOCIATION

We have had a very successful year in connection with the Regina Food Production Association. More gardens were planted this year than ever before and the returns were much better. When the Garden Contest was on for the examination of different gardens in the city for the silver cups donated, we had over one hundred and fifty entries in the different classes. This does not mean that these were all the gardens. It means 150 persons thought they had the best gardens.

We did not purchase any seed or fertilizer in co-operation this year, nor did we adopt the method of co-operation in connection with either the planting and cultivating, marketing, or growing of seed for next year.

There was no occasion for spraying or irrigation in this district.

On payment of the sum of \$2.00 a person became a member of the Association, was entitled to a twenty-five foot lot. This was ploughed, disced, and put in shape for planting by the Association. A person could get two twenty-five foot lots, or, if desirable, could get a large acreage in the suburbs for potatoes. The only co-operation in planting was ten acres of potatoes put in by the Rotary Club. They bought their seed in bulk, had an automobile procession, and all assisted in the planting. After the first planting each man looked after his own portion of the field.

VICTORIA, B.C.

BY W. J. SARGENT, CHAIRMAN, VICTORIA CITY INCREASED PRODUCTION COMMITTEE

Vacant-lot gardening in the city of Victoria has not been carried on by a club, but as a feature of Civic Government. The work was

in charge of a committee of the City Council known as The Increased Production Committee.

The Increased Production Committee purchased from reliable sources, and distributed at cost to cultivators of city lots, or home gardens, all the seed they had applications for.

The ploughing, discing, and harrowing of the lots of all cultivators was done by the Committee at cost.

Having about fifty horses, the city has quite a quantity of stable manure, and, during the summer months, this is sold by contract to some farmer outside the city, who removes it daily from the stables, together with the street sweepings. During the balance of the year, this manure is delivered to any person within the city who will make use of it in fertilizing his garden at a rate of 75 cents per single horse cartload, and every pound of this fertilizer has been readily purchased since the war began. In addition to the stable manure and street sweepings, the Committee distributed, at cost, all the whale guano the cultivators of city lots would purchase, amounting to 12,000 pounds.

There are no potato bugs in British Columbia, and, consequently, there is no need for spraying here against this pest, and for diseases. There has been no co-operative action respecting spraying or treating seed potatoes, but it is likely some action will be taken along this line next season.

The city operates a public market, and all surplus garden produce is conveniently disposed of through this medium.

The growing of garden seeds is being carried on by quite a number of persons in and around Victoria, and, from the contracts already entered into with large seed houses in the interior and eastern Canada, the growing of high class garden seeds bids fair to become one of the important industries of Vancouver Island.

The Committee gave a series of cash prizes for best kept city gardens. This stimulated care in cultivation, which conduced toward better yields with good results.

POTATO GROWING AND GARDENING CONTESTS

The results of the Boys' Potato Growing Contests in Russell and Carleton Counties, and the Girls' Gardening and Canning Competition in Carleton County in 1918, instituted and supported by the late R. B. Whyte, were announced at a public meeting held in the Ottawa City Hall on December 7.

These competitions were confined to boys between the ages of 12 and 18 years. In the Potato Growing Contest, each competitor was required to operate one-tenth of an acre of crop, and to keep an accurate account of his operations and expenditures. In the Carleton County contest, eleven boys entered and seven completed the work. In Russell County, six out of nine applicants complied with all the requirements of the competition.

In each case six prizes were awarded. In Carleton County, the average yield of the prize winners was 219.6 bushels per acre, and in Russell County, 228.8 bushels. The average for the two counties was 210.9 bushels to the acre. The average cost of producing one bushel was 27.3 cents, as compared with 31.87 cents the previous year. The average net profit per acre of the prize winners in the two counties in 1918 was \$64.01, as compared with \$101.82 per acre in 1917. All but one of the competitors, who used the Irish Cobbler variety, confined their crop to the Green Mountain

potato. Six of the competitors at harvest time selected specially desirable hills for planting a special seed plot next year.

THE GARDENING AND CANNING COMPETITION

The Gardening and Canning Competition commenced in 1915 was confined to girls from 10 to 18 years of age, inclusive. Each was required to operate a garden of approximately one-twentieth of an acre and to grow, at least, raspberries, carrots, onions, beets, tomatoes, peas, and beans, and to can and exhibit as many as possible of the crops grown. In this contest 28 girls participated, 21 operated gardens, 12 submitted essays on their work, and 8 carried out the work in all its details.

Most of the competitors grew a large range of crops, the first prize winner growing no less than twenty-seven classes of vegetables and fruits, including forty-two varieties in all.

A factor of this competition was the presentation by the late Mr. Whyte of forty plants of the Herbert raspberry, a variety originated by himself. Each competitor was expected to contribute to friends and neighbours young plants from these from year to year. The reports of the competitors indicated a wide distribution among the farmers of the county from this source.

THE WILD ROSE AS A NATIONAL EMBLEM

BY EDITH PAGET, MANUEL, EDMONTON, ALBERTA

Observing that a national flower is urged for soldiers' graves, I would suggest our wild rose, so plentiful both in Ontario and the western provinces. The brave men who fought our battle "over there" all loved the

wild rose, I am sure. "Rose" for England; why not "Wild Rose" for Canada? I know it is the flower my boy, who is continuing the fight, shall place on his eldest brother's grave, who fell in the war.

ASSOCIATION AND SOCIETIES

EVENTS OF THE COMING MONTHS

- Jan. 6-7-8—Manitoba Cattle Breeders, Horse Breeders, Sheep Breeders, Swine Breeders', Association at Brandon, Secretary, W. I. Smale, Brandon.
- Jan. 7-10—Northern Ontario Poultry Association, Fort William; Secretary, B. Freestone, Fort William.
- Jan. 8—Meetings of Quebec Farmers' Clubs; Oscar Lessard, Secretary of the Council of Agriculture, Quebec.
- Jan. 8-10—Manitoba Grain Grower's Convention at Brandon; Secretary, W. R. Wood, M.L.A., Winnipeg.
- Jan. 8-10—Manitoba Live Stock Conference at Brandon; Secretary, W. I. Smale, Brandon.
- Jan. 8-11—Provincial Poultry Show in Vancouver, B.C.; Secretary, W. C. Jenkins, Vancouver, B.C.
- Jan. 9—British Columbia Poultry Association, Vancouver, Secretary, J. R. Terry, Victoria.
- Jan. 9-10—Eastern Ontario Dairymen's Association Annual Convention. Belleville; Secretary, T. A. Thompson, Almonte.
- Jan. 14-15—Experimental Union, O. A. C., Guelph, Secretary, C. A. Zavitz, Guelph.
- Jan. 14-17—Convention of Agricultural Societies, Poultry Show and Provincial Seed Fair, Saskatoon, Sask.; Secretary-Manager, C. D. Fisher, Saskatoon.
- Jan. 14-17—Ottawa Winter Fair; Secretary, W. D. Jackson, Agricultural Representative, Carp.
- Jan. 15—Quebec Agricultural Societies meeting; Oscar Lessard, Secretary of the Council of Agriculture, Quebec.
- Jan. 15-16—Western Ontario Dairy Association Annual Convention at London; Secretary, Frank Hearn, London.
British Columbia Dairymen's Association at Kelowna, Secretary, T. A. F. Weiancks, Victoria.
Prince Edward Egg and Poultry Association, Charlottetown, Secretary, Wm. Kerr, Charlottetown.
- Jan. 21-22-23—Nova Scotia Fruit Growers' Association, at Bridgetown, Secretary, Manning Ells, Port Williams.
- Jan. 21-24—United Farmers of Alberta annual convention in Edmonton; Secretary, H. Higginbotham, Calgary.
- Jan. 22—Ontario Vegetable Growers' Association Convention, Toronto, Secretary, J. Lockie Wilson, Toronto.
- Jan. 23—Ontario Plowman's Association, Toronto, Secretary, J. Lockie Wilson, Toronto.
- Feb. 3—Canadian Thoroughbred Horse Society annual meeting, Toronto; Secretary, T. J. McCabe, M.A., Toronto, Ont.
Canadian Swine Breeders' Association annual meeting, Toronto; Secretary, R. W. Wade, Toronto.
Canadian Pony Society annual meeting, Toronto; Secretary, G. deW. Green, Toronto.
- Feb. 4—Ontario Swine Breeders' Association annual meeting, Toronto; Secretary, R. W. Wade, Toronto.
Dominion Shorthorn Breeders' Association annual meeting, Toronto; Secretary, Professor G. E. Day, Guelph.
Ontario Berkshire Society annual meeting, Toronto; Secretary, R. W. Wade, Toronto.
Ontario Yorkshire Club annual meeting, Toronto; Secretary, R. W. Wade, Toronto.
Canadian Trotting Association annual meeting, Toronto; Secretary, W. A. McCullough, Toronto.
Canadian Sheep Breeders' Association annual meeting, Toronto; Secretary, R. W. Wade, Toronto.
Canadian Standard Bred Horse Society annual meeting, Toronto; Secretary, John W. Brant, Ottawa.
French Canadian Cattle Breeders' Association annual meeting, Montreal; Secretary, J. A. Couture, Quebec.
French Canadian Horse Breeders' Association annual meeting, Montreal; Secretary, J. A. Couture, Quebec.
Quebec Sheep Breeders' Association annual meeting, Montreal; Secretary, J. A. Couture, Quebec.
Quebec Swine Breeders' Association annual meeting, Montreal; Secretary, J. A. Couture, Quebec.
- Feb. 5—Ontario Sheep Breeders' Association annual meeting, Toronto; Secretary, R. W. Wade, Toronto.
Canadian Jersey Cattle Club annual meeting, Toronto; Secretary, B. A. Bull, Brampton.
Canadian Hackney Horse Society annual meeting, Toronto; Secretary, H. M. Robinson, Toronto.
Canadian Kennel Club annual meeting, Toronto; Secretary, J. E. Dowling, Toronto.

- Dominion Cattle Breeders' annual meeting, Toronto; Secretary, R. W. Wade, Toronto.
- Quebec General Live Stock Associations' annual meeting, Montreal; Secretary, J. A. Couture, Quebec.
- Feb. 5-7—Ontario Horticultural Association annual meeting, Toronto; Secretary, J. Lockie Wilson, Parliament Buildings, Toronto.
- Feb. 6—Canadian Shire Horse Association annual meeting, Toronto; Secretary, G. deW. Green, Toronto.
- Clydesdale Horse Association of Canada annual meeting, Toronto; Secretary, J. W. Wheaton, Toronto.
- Canadian Hereford Association annual meeting, Toronto; Secretary, H. D. Smith, Ancaster, Ont.
- Ontario Horse Breeders' annual meeting, Toronto; Secretary, R. W. Wade, Toronto.
- Feb. 7—Eastern Canada Live Stock Union annual meeting, Toronto; Secretary, R. W. Wade, Toronto.
- Feb. 11-15—Ontario Corn Growers' Association annual meeting and Corn and Grain Exhibition; Secretary, P. L. Fancher, Chatham.
- Feb. 12—Canadian Ayrshire Breeders' Association annual meeting, Montreal; Secretary, W. F. Stephen, Huntingdon, Que.
- Feb. 13-14—Fairs and Exhibitions Association, Toronto, Secretary, J. Lockie Wilson, Toronto.
- Feb. 17-21—Provincial Dairy Show, Winnipeg, Man.; Secretary, L. A. Gibson, Dairy Commissioner, Winnipeg.
- Feb. 18—Pure Maple Sugar and Syrup Co-operative Agricultural Associations annual meeting, Joliette, Quebec; Secretary, Joseph H. Lefebvre, Waterloo, Que.
- Feb. 18—Manitoba Canadian Seed Growers' Association. Annual Meeting at Winnipeg. Secretary, W. F. G. Weiner, Winnipeg.
- Feb. 18-21—Agricultural Societies. Annual Meeting at Winnipeg. Secretary, S. T. Newton, Winnipeg.
- Home Economics Societies, Annual Meeting at Winnipeg. Secretary, S. T. Newton, Winnipeg.
- Feb. 19—Manitoba Bee Keepers' Association. Annual Meeting at Winnipeg. Secretary R. M. Muckle, Winnipeg.
- Feb. 19-20—Manitoba Dairy Association. Annual Meeting at Winnipeg. Secretary, L. A. Gibson, Winnipeg.
- Feb. 20-21—Horticultural and Forestry Association. Annual Meeting at Winnipeg. Secretary, F. W. Brodrick, Winnipeg.

THE POTATO ASSOCIATION OF AMERICA

The fifth annual meeting of the Potato Association of America (an international organization) was held at Milwaukee, Wis., on November 20th and 21st, 1918, at the same time and in the same building as the annual meeting of the Wisconsin Potato Growers' Association.

It was mainly a business meeting for the purpose of electing officers and presenting the reports of the various committees of the Association, the general programme being furnished by the Wisconsin Association.

Much interest was shown in regard to the grading of potatoes and to co-operative grading, which was very unpopular in 1917, when it was first introduced as a federal measure, being now thought well of by many growers. Field inspection work of crops intended to be sold as seed potatoes is practised in Wisconsin, and certified seed, based on the inspection, is sold.

In connection with the meeting there was a very fine potato exhibition held under the auspices of the Wisconsin Potato Association. This included exhibits of potatoes from the different counties of the state, and also about seventy exhibits of ten bushels of potatoes

each representing the general run of potatoes offered for sale by different growers. There were also exhibits of potato machinery, potato by-products, and fertilizers, also of diseases affecting the potato.

The following officers for the Potato Association of America were elected: President W. Stuart, U.S. Department of Agriculture, Washington; Vice-President, W. T. Macoun, Dominion Horticulturist, Ottawa; Secretary, F. H. Douthitt, Market Bank Building, Minneapolis, Minn.; Treasurer, A. G. Tolaasa, Experiment Station, St. Anthony Park, Minn.

The Association publishes a monthly periodical known as *The Potato Magazine*, which is sent out from the Secretary's Office, Minneapolis, Minn.

The Dominion Government was represented at the Meeting by Mr. W. T. Macoun, Dominion Horticulturist, and the Ontario Government by Mr. Justus Miller, Assistant Agricultural Commissioner and Potato Specialist.

The Potato Association of America is international in its scope and the following objects for which the Association was orga-

nized should prove of interest to the readers of THE AGRICULTURAL GAZETTE and to Canadians generally:

(1). To bring together for mutual co-operation and co-ordination of effort all agencies interested in the production, transportation, distribution, and utilization of potatoes, and the promotion of the potato industry in all its phases.

(2). To make a special effort to popularize, and as a result increase, the individual consumption of that most important food product—THE POTATO.

(3). To create a general interest in better seed, true to name and free from disease.

(4). To stimulate the development of new and improved varieties, possessing greater adaptability to special soil or climatic conditions; a higher starch content, greater productiveness, or marked immunity of vine or tuber to disease.

(5). To provide for the proper description of varieties and the establishment of a bureau of registration and nomenclature for new and worthy introductions.

(6). To encourage a system of pure seed certification through field inspection of the growing crop.

(7). To assist in determining varietal adaptation through uniform varietal tests in all parts of the country.

(8). To encourage the coordination of potato investigations by the United States Department of Agriculture and the State Experiment Stations.

(9). To raise the standard of market requirements for table stock through more careful grading and packing, and better eating quality.

(10). To stimulate the investigation of methods for the profitable utilization of surplus and cull potatoes.

(11). To encourage measures designed to safeguard our American industry against the introduction of disease and insect pests.

(12). To establish a more effective system of distribution and marketing.

(13). To encourage the formation of co-operative growing and selling exchanges.

(14). To promote an interest in potato contests and exhibitions.

(15). To establish and maintain a system of crop forecasting for the mutual benefit of all its members.

(16). To collect and disseminate the best available information relating to both the practical and scientific phases involved in increased yields, coupled with a lessened cost.

(17). To have published in daily newspapers, magazines, and other periodicals, news items, recipes, etc., supplied by the Secretary, tending to a more general and abundant use of the potato and potato products.

FEDERATION OF WOMEN'S RURAL ORGANIZATIONS

A movement is on foot to bring about a federation of women's institutes, home economics societies, and homemaker's clubs throughout Canada. An organization meeting will be held in Winnipeg on February 17, 18, and 19, at which it is expected delegates

from each of the provinces will be present to work out a constitution and a programme for future action. The movement has been set on foot by Miss MacIsaac, Superintendent of Women's Institutes in Alberta.

WESTERN AGRICULTURE AND ARTS ASSOCIATION

The twenty-second annual meeting of the Western Agriculture and Arts Association was held at Brandon, Manitoba, on December 12th, 1918. The principal matter brought before the association was the report of the Brandon Summer Fair, which showed that owing to climatic conditions there was a

deficiency of ten thousand dollars. However the meeting expressed itself completely satisfied with the management. Mr. R. M. Matheson, of Brandon, was re-elected President and Mr. W. H. Bates, of Brandon, Secretary.

QUEBEC POMOLOGICAL AND FRUIT GROWING SOCIETY

The annual meeting of the Pomological and Fruit Growing Society of Quebec was held at Macdonald College, Ste. Anne de Bellevue, on December the 12th. Father Leopold of La Trappe presided until the election of officers, which resulted as follows: Hon. president, Prof. Wm. Lochhead, Macdonald College; Hon. Vice-president, Z. A. Raymond, Plessisville; President, C. E. Petch, Hemmingford; Vice-president, Rev. Abbe Levasseur, St. Anne de la Pocatière;

Secretary-treasurer, Peter Reid, Chateauguay Basin. The meeting decided that a strong publicity campaign on behalf of Quebec fruit products was desirable. It was decided to take prominent steps toward the establishment of an annual fruit exhibition in Montreal. Resolutions were also passed favouring the continuation in office of the Canada Food Board and urging an increase of the penalty for spraying trees during the blossoming period, so as to prevent injury to the

bee industry. Valuable papers were read by Father Leopold, Prof. T. G. Bunting, Prof. W. T. Macoun, Dominion Horticulturist, Prof. W. H. Chandler, Ithaca, N.Y.,

and others. Films illustrating strawberry and raspberry culture were shown with explanatory addresses.

ONTARIO HEREFORD BREEDERS' SALE

The inaugural yearly sale of Hereford cattle under the management of the Ontario Hereford Breeders' Association was held in the Winter Fair Buildings, Guelph, Ontario, December 13th, 1918. Upwards of fifty animals were offered for sale, the total amount received being \$16,055 and the average price \$305. The highest price paid was \$860 for

the four-year-old heifer Lorna Fairfax, imported from Indiana, and consigned for sale by James Page of Wallacetown. The second highest price was \$700, which was paid for the three-year-old heifer Peggy from the herd of John Black and Sons, Amaranth, Ontario.

ONTARIO POULTRY ASSOCIATION

The annual meeting of the Ontario Poultry Association was held in Guelph on December 6, and proved to be the largest attended and most enthusiastic gathering of the Association held in late years. The Secretary, Mr. R. W. Wade, presented the new constitution and it was adopted with little change. The financial statement showed a balance on hand of \$560.03. In

response to a request the pigeon fanciers were given representation on the Board. The election of officers resulted as follows: President, G. G. Henderson, Hamilton; 1st vice-president, A. G. Field-Marshall, Beamsville; 2nd vice-president, W. R. Graham, O.A.C., Guelph; secretary-treasurer, R. W. Wade, Toronto; assistant-secretary, J. E. Rettie, Toronto.

NEW BRUNSWICK BREEDERS' CONSIGNMENT SALE

Postponed from Nov. 7 to Nov. 21, 1918, on account of the influenza, the New Brunswick breeders' consignment sale at Fredericton, was not the success hoped for. It was the first sale of the kind held in the province and the weather was unfavorable. The prize-winning Holstein bull, Favorit Champion, fetched the highest price, namely \$500.00, bid by a Quebec breeder. The

highest price paid for a Shorthorn bull was \$155.00, given for a yearling, and for a Shorthorn cow \$220.00 for a seven-year-old. For the two-year old Ayrshire bull Springbrook Prince George \$300.00 was paid. For a flock of Cheviot sheep, consisting of one ram and nine ewes, \$615.00 was paid. Horses were not in demand.

NEW BRUNSWICK LIVE STOCK BREEDERS' ASSOCIATION

The evening previous to the breeders' sale on Nov. 21, the New Brunswick Live Stock Breeders' Association was formed with Mr. Thos. G. Hetherington, B.S.A., Provincial Superintendent of Live Stock, as secretary, and the following executive: Horse, J. C. Hewitt, Fredericton; cattle—Short-

horns, R. A. Snowball, Chatham; Holsteins, Thos. Harding, Welsford; Ayrshires, A. C. Taylor, Salisbury; Jerseys, J. H. Manchester, Apohaqui; Sheep, Burder Goodwin, Baie Verte; Swine, W. S. Harding, Hammond, River.

NEW BRUNSWICK AGRICULTURAL SOCIETIES UNITED

At the annual meeting of the New Brunswick Agricultural Societies United, held at Fredericton on Nov. 28th, the officers elected

were: President, W. H. Moore, Scotch Lake; vice-president, Charles M. Shaw, Hartland; Secretary-Treasurer, J. D. McKenna, Sussex.

CONSTITUTION OF BREEDERS' ASSOCIATIONS

One of the activities of the agricultural representative in some of the counties has been to organize breeders' associations. One of these associations was organized by Mr. N. C. McKay, District Representative in Bruce County, the annual sale of which was reported in THE AGRICULTURAL

GAZETTE of May this year. For the information of those contemplating similar organizations there is published below the constitution of the North Bruce Breeders' Association:

1. This Organization shall be known as the North Bruce Breeders' Association.

2. The objects of the Association are the promotion of good fellowship among its members and the advancement of the general interests of pure-bred cattle by holding public sales at auction, discussions of the best methods of breeding and rearing cattle, and in other ways extending interest of pure-bred cattle and establishing a reputation for Bruce County as the centre for high class live stock.

3. The membership shall consist of persons who each own at least one pure-bred animal and have paid the required annual fee.

4. Every application for membership shall be passed upon by the board of directors.

5. The officers shall be, president, one or more vice-presidents, and secretary-treasurer. There shall also be not more than ten directors.

6. The Agricultural Representative of the Department of Agriculture shall be ex-officio one of the directors.

7. The executive shall consist of the president, vice-presidents, two directors, and the secretary.

8. The officers and directors shall constitute the board of directors, who shall have entire control and management of the affairs and business of the association, with full power to do what they deem right and proper for the best interest of the association.

9. In the event of any office becoming

vacant from any cause, the vacancy shall be filled by the board of directors for the unexpired term of that office.

10. At any meeting of the board of directors duly called, a majority of its members shall constitute a quorum.

11. At any meeting of the association duly called fifteen per cent of the membership shall constitute a quorum.

12. Notice of any proposed amendment to the by-laws shall be handed to the secretary at least 30 days previous to the meeting at which such amendment is to be acted upon, and notices of such proposed amendment shall be sent by the secretary to each member of the association at least one week previous to such meeting.

13. The duties of the officers shall be those customary to such positions in similar organizations.

14. The regular annual meeting of the association shall be held between the first and fifteenth of June each year.

15. Special meetings may be held from time to time as the board of directors deem advisable.

16. Notices of regular or special meetings shall be mailed by the secretary-treasurer to the last known address of each member.

17. The annual membership fee shall be one dollar (\$1) payable on or before the 15th day of June in each year for the ensuing year.

THE PATHOLOGICAL SOCIETY

Recently Canada was included as a district of the War Emergency Board of American Plant Pathologists. A meeting was held at the Ontario Agricultural College, Guelph on December 6 and 7 of this district, comprising all the Canadian pathologists that could be brought together. Four of the War Emergency Board Commissioners attended from various districts in the United States. Dr. W. H. Whetzel, Cornell University referred to the results that had already been achieved by speeding up on important problems, such as smut and rust treatment in cereals. He said, however, the outstanding feature of the year's work was the co-operative spirit that had been developed among plant pathologists. Mr. W. P. Fraser, of the Botanical Division of the Experimental farms system, undertook to arrange for further co-operative work on cereal troubles. Potato diseases also came in for considerable attention. Other problems that arose for discussion concerned truck diseases, transportation and storage diseases, and timber diseases. The question of the plant quarantine as it affects Canadian interests was also briefly dealt with. It was decided to start at once a Canadian plant disease survey to be carried out by the co-operative effort of Federal and Provincial pathologists, University and Agricultural College experts, and other agencies. The collection of data in

connection therewith was placed in the hands of Mr. G. C. Cunningham of the Experimental Farms.

It was decided to form a branch of the American Phytopathological Society, similar to one that already exists on the Pacific coast, and the following officers were elected: President, Professor J. E. Howitt, Ontario Agricultural College, Guelph, Ontario; Vice-president, Mr. W. A. McCubbin, Field Laboratory of Plant Pathology, St. Catharines, Ontario; Secretary-Treasurer, Dr. R. E. Stone, Ontario Agricultural College, Guelph, Ontario.

The meeting concluded by adopting a series of resolutions. These included a suggestion that additional equipment and trained men be provided for the elimination of seed-borne potato diseases; a recommendation that the work in control of cereal diseases now being prosecuted in the West be further developed and extended throughout the Dominion; a suggestion that further steps be taken to eradicate the barberry, and a motion urging Dominion and Provincial authorities to aid in the carrying out of the policy recommended by the International Committee for the suppression of the White Pine Blister Rust. (See articles in Vol. V of THE AGRICULTURAL GAZETTE of Canada, pages 186 and 339.)

THE DOMINION GRANGE

The annual meeting of the Dominion Grange was held in Toronto on December 16, 1918, when the following officers were elected: Worthy Master, J. C. Dixon, Moorefield; Worthy Overseer, Howard Bertram, Midhurst; Secretary-Treasurer, Neil E. Burton, Port Stanley, R.R. 2; Assistant Secretary-Treasurer, Miss Hattie Robinson, St. Thomas, R.R. 1; Chaplain, William McCrae, Guelph, R.R. 7; Lecturer, Alfred

Gifford, Meaford; Steward, Wm. Oke, Whitby; Assistant Steward, Henry Glendenning, Manilla; Stewardess, Miss Alice Palmer, Port Stanley, R.R. 2; Gatekeeper, W. J. Goodfellow, Allandale; Ceres, Miss M. A. Philp, Whitby; Pomona, Miss Lena Hill, St. Thomas; Flora, Miss M. Thomson, Palmerston, R.R. 3; Auditor, John Pritchard, Gorrie.

ALBERTA PROVINCIAL SHORTHORN BREEDERS' ASSOCIATION

At the annual meeting of the Alberta Provincial Shorthorn Breeders' Association held in Calgary on December 11, the following officers were elected: Honorary President, Hon. Duncan Marshall; Hon. Vice-president,

J. Chas. Yule; President, Senator Peter Talbot; First Vice-president, Percy Switzer; Second Vice-president, T. P. Ralphs; Secretary, Chas. Beeching, Nanton, Alta.

ALBERTA ABERDEEN ANGUS ASSOCIATION

The Alberta Aberdeen Angus Association at their annual meeting held on December 11, elected the following officers: Honorary President, G. H. Hutton; President, C.

Ellett; First Vice-president, J. F. Day; Second Vice-president, J. J. Bell; Secretary-Treasurer, N. F. Bell, University of Alberta, Edmonton.

ONTARIO CANADIAN SEED GROWERS.

The annual meeting of the Ontario branch of the Canadian Seed Growers' association was held at Guelph during the Winter Fair. A resolution was adopted declaring that no new variety of seeds for farm crops should be sold to the public for seeding purposes before being tested and reported on by the Ontario Agricultural College or other experts.

The following officers were elected: President, A. S. Maynard, Chatham; vice-president, Professor W. J. Squiuel, Ontario Agricultural College, Guelph; Secretary-treasurer, W. J. Lennox, Front St., Toronto; Executive committee, A. W. Mason, Ontario Agricultural College, Guelph; A. McMeans, Brantford; R. J. Wilson, Charing Cross, Ontario.

NEW PUBLICATIONS

FEDERAL DEPARTMENT AGRICULTURAL

DOMINION EXPERIMENTAL FARMS

Report of the Experimental Farms.—Issued as an appendix to the report of the Minister of Agriculture, the Report of the Experimental Farms for the fiscal year ending March, 1918, gives a brief review of the year's progress in the various lines of work under way at the Central Farm and the twenty Experimental Farms and Stations distributed over Canada.

THE DIVISION OF ANIMAL HUSBANDRY

The Division of Animal Husbandry has issued a four-page leaflet dealing with "*Recleaned Elevator Screenings (Standard Stock Food) as a Food for Live Stock.*" The leaflet, which has been prepared by Mr. G. B. Rothwell, B.S.A., Assistant Dominion Animal Husbandman, explains what is meant by "Elevator Screenings" and gives results of experiments that have been made at the Central Experimental Farm, Ottawa.

THE DAIRY AND COLD STORAGE BRANCH

Keep Dairy Herd Records. Circular No. 25 of the Dairy and Cold Storage Branch in

eight pages deals with the keeping of dairy records. It gives a statement showing how the records should be kept and also blank forms of application for assistance in the work and for employment as a milk tester, besides notes of interest both to testers and to owners.

THE SEED BRANCH

Pamphlets No. S-3 to S-10, recently issued by the Seed Branch, deal with Ribgrass, also known as Buckhorn, Narrow-Leafed Plantain, English Plantain, Ribwort; Ragweed; Night-Flowering Catchfly or Sticky Cockle; Green Foxtail, or Pigeon Grass or Bottle Grass; Black Medick, also known as Yellow Trefoil Hop Clover, and Hop Trefoil; Sheep Sorrel, known as Sour-Grass, Field Sorrel, and Red Sorrel; Plantains, and Upright Cinquefoil.

Seed Importation Regulations. Pamphlet No. S-12 of the Seed Branch contains the order in council, regulations, instruction under the order in council, and a general explanation of the regulations governing the importation of seed of clover, grasses, vetches, other forage plants, field root and garden vegetables.

PROVINCIAL DEPARTMENTS OF AGRICULTURE

NEW BRUNSWICK

Save Canada's Wheat, Publication No. 36 of the Women's Institute Division contains 32 pages of recipes for making many things in which substitutes are used, the general aim being to save wheat flour as much as possible. Miss Hazel B. McCain, Supervisor of Women's Institutes, and Miss Elizabeth P. Nutter, Demonstrator, are responsible for the contents of the publication.

ONTARIO

The Annual Report of the Bureau of Industries for the Province of Ontario for the year 1917 consists of 48 pages and is divided into two parts, the first giving agricultural statistics and the second dealing with chattel mortgages.

The Annual Reports of the Dairymen's Associations of the Province of Ontario for the Year 1917 have been issued and make a volume of 128 pages. Verbatim reports of the proceedings at the forty-first annual convention of the Dairymen's Association of Eastern Ontario, held at Perth on Jan. 10 and 11, 1918, and of the fifty-first annual convention of the Western Ontario Dairymen's Association, held at Stratford on Jan. 16 and 17, 1918, are given. Reports of the Dairy Branch of the Ontario Agricultural College and of the Eastern Dairy School, Kingston, are also presented.

The Farm Water Supply and Sewage Disposal. Messrs. W. H. Day, B.A., Professor of Physics; R. R. Graham, B.A., B.S.A., Lecturer in Physics; Dan. H. Jones, B.S.A., Professor of Bacteriology; and H. L. Fulmer, B.S.A., Lecturer in Chemistry, have contributed a series of articles on "Farm Water Supply," on the one hand, and the "Disposal of Sewage" on the other. The subjects are thoroughly discussed with numerous enlightening illustrations, the whole making a blue book of 80 pages.

ALBERTA

Rural School Lunches, The Provincial Minister of Education has issued a book of 20 pages dealing very fully with school lunches, the condiments required and the method that should be followed in their preparation for consumption.

MISCELLANEOUS.

The Hawks of the Canadian Prairie Provinces in Their Relation to Agriculture, by P. A. Taverner, form the subject of Museum Bulletin No. 28, published by the Department of Mines. Full descriptions of the different species of hawks are given along with coloured plates of these predatory birds.

Women and Reconstruction.—The women's department of the Canadian Reconstruction Association has issued in a pamphlet of two pages an appeal for the co-operation of Canadian women in solving economic and industrial problems and an examination of the relationship of homes to national business.

NOTES

Mr. James McCaig, M.A., Editor of Publications in the Alberta Department of Agriculture, has had added to his duties that of Publicity Commissioner of Alberta.

The Provincial Department of Agriculture of Quebec have issued a notice stating that the special grant of \$75 to societies holding seed grain exhibitions will be continued this year.

The Department of Agriculture of Quebec is offering the agricultural societies, farmers' clubs, co-operative societies, and other agricultural organizations, a number of carloads of linseed oil meal (old process) in 200 lb. bags at \$62 per ton, f.o.b. Buffalo, including war tax. The Department is also offering a few carloads of corn from 1,400 to 1,500 bush. at \$1.40 per bush., f.o.b. Tiffin, Ont. These feeds were acquired through the Feed Division of the Federal Live Stock Branch.

In order to make a complete canvass of the county for young men to attend the Short

Course Schools, Mr. E. P. Bradt, formerly Agricultural Representative in Dundas county Ontario, enrolled the services of junior farmers, school teachers, and a prominent farmer in each school section, each of whom was asked to supply the names of eligible young men. These men are being called together for the purpose of acquainting them with the nature of the courses and enlisting their services in working up a large class.

As forecasted by Mr. W. J. Black, Commissioner under The Agricultural Instruction Act, in his article on "Agricultural Training for Returned Soldiers", that appeared in the December number of THE AGRICULTURAL GAZETTE, training farms are being organized in Great Britain, under the Khaki Unniversity, on which instruction in agriculture will be given to soldiers between the cessation of hostilities and the return of the men to Canada. To assist in organizing the instruction courses to be given on these farms, Mr. C. F. Bailey, Assistant Deputy Minister of Agriculture for Ontario has

been sent to England by the federal Government for a period of about two months. This work will link up the Khaki University with the Soldiers' Settlement Board, of which Mr. Black is Chairman.

A cablegram received from Dr. James W. Robertson, who is at present in London, Eng., with the Dominion peace delegates, addressed to the Canada Food Board, reads as follows:

"The following minute was passed by the Imports Board of the British Ministry of Food; The chairman expressed the Board's appreciation of the way in which Canada and the Canada Food Board has saved the butter situation in the United Kingdom, by requisitioning butter in the Dominion. This was strongly endorsed by Mr. Metcalf, chairman of the butter section on behalf of that section. He stated that it was entirely due to Canada that the weekly one-ounce ration of butter per person had been maintained."

A writer in *The Monetary Times*, published in Toronto, in dealing with the Grain Growers' Associations of the Prairie Provinces, supplements the particulars regarding these organizations given in THE AGRICULTURAL GAZETTE of December on page 1175. He refers in particular to the growth and development of the Saskatchewan Co-operative Elevator Company. He says that the Company has elevators in nearly every town in Saskatchewan and that they have just finished building one of the largest terminal elevators at Fort William. They have a building in Regina 50 ft. wide by 150 ft. deep. He further says that he found that in the Bank of Hamilton building in Winnipeg, nine stories of the eleven of which the building consists, are devoted to the business of farmers' organizations. The writer quotes these things to show the progress that the farmers of the West have made in the transaction of business.

At the International Live Stock Show recently held in Chicago the team from the

Ontario Agricultural College won the live stock judging contest, which was confined to three colleges. The scoring resulted as follows:—Ontario, 3,865; Iowa, 3,824; Nebraska, 3,787. In judging beef cattle C. F. MacKenzie of Ontario was first. In judging sheep R. L. Begg, Ontario, was second and, D. J. Matheson, Ontario, third. In swine judging C. Lamont, Ontario, was first, R. L. Begg, second, and C. F. MacKenzie, third. The college wins the Bronze Trophy; Mr. Begg takes the blue ribbon and gold medal, and Mr. Lamont a silver cup for the highest man in swine. The college secures a medal for the highest score in all classes, a medal for the highest score in sheep, and another for the highest score in swine. This is the fourth time the college has won the premiership in live stock judging at the International.

In an address before the Ottawa branch of the Society of Chemical Industry, Dr. Frank T. Shutt, Dominion Chemist, warmly advocated the formation of a national society of chemists, founded on the same lines as the Institute of Chemistry of Great Britain and Ireland and the Australian Chemical Institute, with fellows and associates. In his advocacy Dr. Shutt referred to the importance of agriculture in the matter of chemical research. He said, "Of agriculture, Canada's largest and most important industry, from an experience of more than 30 years I can speak with some authority and I can unhesitatingly say that all true and permanent progress will be, and must be, based on scientific work and investigation, and I will go further and say that of all the sciences taking part in this work—and they are many—chemistry is the one that above all others will, and must, take the first place. The problems in agriculture that await solution are practically innumerable, and they are varied as to their character and nature; but I venture to say there are few of them that do not call at one stage or another in their working out for the assistance that chemistry only can give. There is a great future for profound chemical investigatory work in agriculture."

It is possibly too soon to attempt any outline of what the agriculture of the next few years may demand. It seems likely, however, that after the period of readjustment there will be a keener competition in the markets of the world than ever before. We have witnessed the great spectacle of the world being fed with millions of men withdrawn from the occupations of production. While some parts of the world have suffered severely, this period will now soon be past, and with the return of men to the soil in all parts of the world we may expect keener competition than existed in the pre-war days. This need not lessen the opportunities in agriculture, but does emphasize the importance of bringing to bear the highest intelligence in order to meet this competition. This must not be merely in the matter of production alone, but on the subjects of farm management and of marketing. The quality of the food offered to the public will not only largely determine the prosperity of the individual but will also determine the prosperity of the country from an agricultural standpoint.

Hon. GEO. S. HENRY, Minister of Agriculture for Ontario in the O.A.C. Review.

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 Dec. 4, 1918.—The First Grain in the West. Chester Martin, Professor of History, University of Manitoba, page 58a.
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 Education in Agriculture, Jas. McCaig, Editor of Publications, Department of Agriculture, Alberta, page 1516.
- O.A.C. Review*, Guelph, Ont., Nov., 1918.
 The Belgian Horse. Wade Toole, Professor of Animal Husbandry, O.A.C., page 81.
- The Saskatchewan Farmer*, Moosejaw, Sask., Dec., 1918.
 Feeding the Brood Sow in Winter, G. B. Rothwell, Asst. Dominion Animal Husbandman, page 21.
 Winter Housing for Swine. G. H. Hutton, Superintendent, Experimental Station, Lacombe, Alta, page 22.

PART V

The International Institute of Agriculture

FOREIGN AGRICULTURAL INTELLIGENCE

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SCIENCE AND PRACTICE OF AGRICULTURE

GENERAL INFORMATION.

833—The Influence of Specific Carbohydrates and Grains, Other than Oats, on the Development of Scurvy.—PITZ, W., in *The Journal of Biological Chemistry*, Vol. XXXIII, No. 3, pp. 471-482, Bibliography. Baltimore, 1918.

835—The Value of the Yeast Vitamine Fraction as a Supplement to a Rice Diet.—EMMETT, A. D. and MCKIM, L. H., in *The Journal of Biological Chemistry*, Vol. XXXII, No. 3, pp. 409-419, Bibliography of 9 Publications. Baltimore, Md., December, 1917.

837—Experiments on the Digestibility of Fish. HOLMES, A. D., in *U. S. Department of Agriculture, Bulletin* No. 649, 14 pp., Washington, April 13, 1918.

In the study of the digestibility of the protein and fat supplied by some common varieties of fish, fish in the form of "fish loaf" was served as the major part of a simple mixed diet, which also included potatoes, crackers, fruit, sugar, and tea or coffee. Considering the experiments as a whole, the total diet supplied on an average 99 gm. of protein, 60 gm. of fat, and 160 gm. of carbohydrates daily, the fuel value being 1,576 calories. The low amount of fat and of carbohydrates was due to the fact that butter and similar fats were omitted and the foods other than fish loaf which supplied both protein and carbohydrates, were limited in order that both the fat and the protein in the diet might be contributed in as large proportion as possible by the fish.

The principal results are summarized in the following table:—

Number of experiments	Kind of fish	Average amount of fish eaten per man per day	Digestibility of fish protein	Digestibility of fish fat
		grams	per cent	per cent
3	Mackerel (<i>Scomber scombrus</i>).....	448	93.1	95.2
3	Butterfish (<i>Poronatus triacanthus</i>).....	471	91.9	86.4
8	Grayfish (<i>Squalus acanthias</i>).....	440	92.8	94.3
4	Salmon (<i>Oncorhynchus tshawytscha</i>).....	355	93.2	93.7

As these figures show, the average coefficients of digestibility for fish proteins are in close agreement, therefore it would seem, from a dietetic standpoint, that the different fishes studied would supply protein in equally available form. The fats were well assimilated in the case of the mackerel, grayfish, and salmon, which, according to the usual custom, are to be regarded as "fat fishes". Considering the experiments as a whole, the very complete utilization of the protein and fat supplied by the fishes studied offer additional experimental evidence that fish is a very valuable food and that its extensive use in the dietary is especially desirable.

CROPS AND CULTIVATION.

838—Movement and Distribution of Moisture in the Soil.—HARRIS, F. S. and

TURPIN, H. W., in *Journal of Agricultural Research*, Vol. X, No. 3, pp. 113-155, Bibliography of 35 Publications. Washington, D.C., July 16, 1917.

During recent years considerable difference of opinion has arisen regarding the importance of the capillary movements of soil moisture and also regarding the laws governing the final distribution of moisture in the soil. In order to solve this problem the authors carried out a series of laboratory and field experiments under irrigation and dry-farming conditions. The experiments represent several thousand moisture determinations. The field studies include the effect of fallow, kind of crop, manure, irrigation water, surface mulches, cultural methods, and seasonal conditions on the movement and distribution of soil moisture. The laboratory

studies include the effect of the initial percentage of moisture, gravity, soil type, source of supply, etc., on the movement and distribution of moisture in the soil.

RESULTS.—In field soils the moisture content of the fallow soils averaged greater than that of the cropped soils.

Unmanured irrigated land showed less difference in moisture between cropped and fallow than did the manured.

Irrigation influenced the top feet of the cropped plots proportionately more than the fallow, but water did not appear to penetrate the fallow plots below 7 feet as readily as it did the cropped ones. Under dry-farming conditions the difference in moisture between cropped and fallow plots was not noticeable until after June 16. Cropped plots showed more fluctuation than fallow ones. Wheat, maize, potatoes, and peas drew most of their moisture from the first 4 feet in depth. The wheat land contained less moisture in the autumn than the other cropped soils, with maize following.

The increase in moisture due to applications of 5 to 7½ inches of irrigation water was felt to depths of 10 feet in 24 hours, although most of the increase was in the first 4 feet.

The effect of mulches in preventing moisture loss under both irrigation and dry-farming was noticeable several feet below the surface of the ground, but the surface foot showed the greatest benefit from mulches. A straw mulch proved considerably better than a 2-inch soil mulch.

Mulches on irrigated plots appear to influence the moisture content of the soil to greater depths than do those under dry-land conditions. A dry-farm plot kept free from weeds in 1916 but not mulched lost very little more water than one mulched 2 inches deep. A 6-inch cultivation on spring-ploughed and a 2-inch cultivation on autumn-ploughed dry-farm land seemed to conserve the moisture best.

Subsoiling 15 inches deep had little influence on the moisture; spring discing was rather a distinct benefit.

An 8-year average shows that spring ploughing under dry-farming conditions at Nephi conserves moisture better than autumn ploughing. This difference in favour of spring ploughing is shown more below the first foot than in the first foot, and more in summer and autumn than in spring.

A precipitation as small as 0.1 inch under dry-farming conditions could not be detected in moisture determinations soon after, but, when as much as 0.5 inch fell within a short time, an increase in moisture was noticed to a depth of 6 feet.

When freely supplied with water, a soil with a high initial percentage of moisture will come to a moisture equilibrium sooner than a drier one, but if given time the drier soil will absorb a greater quantity through a long distance either upward or downward than will the wet one.

The rate of moisture penetration in the first 10 days was nearly twice as great with initial percentages above 15 as with 5 or below, and nearly twice as rapid after a 15-inch irrigation as after a 5-inch one. Under the most favourable conditions 7 feet was influenced in 10 days.

Moisture movement from soils of optimum moisture content into soils of differing initial percentages varied to an extent inversely as the initial content of the dry soil. At the end of six weeks, however, the amount of water actually in the soils still varied directly as the initial percentage.

The higher the percentage of moisture in the soil supplying the water to a dry-soil, the more rapidly and farther from the source of water did the moisture move.

Even when the source of water was an unsaturated soil, greater and faster movement took place when the water was moving downward than upward. When the quantity of soil yielding the water was so small as to make the total moisture content of both moist and dry soils very low if equally distributed, the effect of gravity was not great.

Moisture from a nearly saturated soil moved a greater distance into loam than into sand in 139 days and into sand farther than into clay. The clay, however, contained more moisture in the layer of soil next the water supply than the others and sand contained by far the least.

Sand, with 7.77 per cent of moisture, gave up its moisture to loam much more readily than did the loam with 31.09 or clay with 24.62 per cent of moisture.

The rate of rise of moisture from soils of varying fineness when used either as water sources, or water absorbers varied inversely with the fineness. Water rose to a height of over 30 inches in a loam soil from a moist sand in 94 days, while from a moist clay it rose little more than 6 inches in this length of time. In all soils the most rapid rise of the water was during the period soon after being placed in contact with the water.

Although the rise of the moisture was more rapid in the sand and loam than in the clay, the rise continued steady longer in the clay than in the others.

839—Studies in Soil Reaction as Indicated by the Hydrogen Electrode.—I. PLUMMER, J. K., Studies in Soil Reaction as indicated by the Hydrogen Electrode, in the *Journal of Agricultural Research*, Vol. XII, No. 1, pp. 19–31, Bibliography of 13 Publications. Washington, D.C., January 7, 1918.—II. HOAGLAND, D. R. and SHARP, L. T., Relation of Carbon Dioxide to Soil Reaction as Measured by the Hydrogen Electrode, in the *Journal of Agricultural Research*, Vol. XII, No. 3, pp. 139–148, Bibliography of 11 Publications. Washington, D.C., January 21, 1918.

841—Formation of Black Alkali (Sodium Carbonate) in Calcareous Soils.—

BREAZEALE, J. F., in *Journal of Agricultural Research*, Vol. X, No. 11, pp. 541-589, 26 Figs., Bibliography of 7 Publications. Washington, D.C., September 10, 1917.

With the exception of an adequate water supply, the presence and accumulation of alkali is probably the most important problem that confronts the man engaged in farming under irrigation in the arid and semi-arid regions of the West.

As ordinarily used, the term "alkali" indicates the salts of sodium, together with calcium and magnesium salts in lesser amounts. In this paper the term includes all the water-soluble salts of the soil, whether organic, or inorganic. This paper discusses only one specific phase of alkali formation and that is that which takes place when sodium salts are present in a calcareous soil. The conclusions arrived at are as follows:—

1) In the reaction between sodium nitrate (or sodium chloride or sodium sulphate) and calcium carbonate, resulting in the formation of sodium carbonate, the presence of relatively small amounts of calcium nitrate or calcium chloride in the reaction impedes and may prevent the formation of sodium carbonate.

2) The presence of a saturated solution of calcium sulphate in this reaction does not entirely stop the formation of sodium carbonate.

3) Sodium nitrate, sodium chloride and sodium sulphate in the presence of carbon dioxide react with calcium carbonate with the formation of sodium bicarbonate.

4) The presence of relatively small amounts of calcium nitrate or calcium chloride in this reaction impedes and finally prevents the formation of sodium bicarbonate.

5) The presence of calcium sulphate has no effect in preventing the formation of sodium bicarbonate when sodium sulphate or a mixture containing sodium sulphate reacts with calcium carbonate.

6) A field application of gypsum will probably have no effect in overcoming black alkali if the soil already contains soluble sulphates in appreciable amounts, or if the irrigation water contains these salts.

7) Sodium nitrate, sodium chloride, and sodium sulphate increase the solubility of calcium carbonate in the soil.

8) Sodium nitrate, sodium chloride, and sodium sulphate react with calcium carbonate in the soil with the formation of sodium carbonate ("black alkali").

9) Sodium carbonate, formed by the above reaction, decomposes the organic matter of the soil.

10) Calcium carbonate has a slightly destructive action upon the organic matter of the soil.

11) Sodium carbonate is much more destructive to organic matter than sodium bicarbonate.

12) The alkali crusts that accumulate upon the soil in some irrigated regions are due in part to the action of sodium salts upon

calcium carbonate with the formation of sodium carbonate.

13) Barren, or "slick", spots are often due to the action of sodium nitrate, sodium chloride, or sodium sulphate upon calcium carbonate with the formation of sodium carbonate.

14) Sodium chloride and sodium sulphate have a protective action upon organic matter in the presence of sodium carbonate.

15) A calcareous hardpan often produces black alkali.

842—Influence of Carbonates of Magnesium and Calcium on Bacteria of Certain Wisconsin Soils.—FULMER, H. L., in *Journal of Agricultural Research*, Vol. XII, No. 8, pp. 463-504, 19 Tables, Bibliography of 64 Publications. Washington, February 25, 1918. (2 pp. in Institute Bulletin.)

845—Leakages from Irrigation Canals and Reservoirs in the U.S.A.—DAVIS, A., in the *Engineering News-Record*, Vol. LXXX, No. 14, pp. 663-665. New York, April 4, 1918.

In numerous cases in the United States the admission of water into irrigation canals and reservoirs has disclosed the existence of subterranean cavities not previously observed. The author quotes three examples of canal troubles (those of Flathead; Grand Valley Lands, Colorado; and Spanish Fork Canal, Utah) and six of difficulties with reservoirs (Jerome and Deer Flat reservoirs, Idaho; Lake McMillan and Hondo reservoir, New Mexico; Walnut Canon reservoir, Arizona; and Tumalo reservoir, Oregon). For each of these he describes the difficulties and the remedies applied, discussing the successes or failures.

Some of the difficulties encountered, especially in canal building, are of such nature that no method of foreseeing them appears to be possible.

In the case of canals, however, these difficulties are usually easily remedied, either by puddling the cavities that appear, as at Flathead and Grand Valley, or by relocation, as at Carlsbad. Remedies in the case of reservoirs are not so easy. Puddling is useless if the subterranean conditions are such that the seepage of water can get away and thus let the seepage continue. No reservoir in earth is of much value if it continuously seeps at the rate that water can pass vertically through puddled earth. The problem then is to avoid regions where subterranean conditions are such that the water can escape. A few rules of caution may be of value:—

1) Avoid reservoirs adjacent to gypsum deposits and to limestone deposits which show evidence of caves.

2) Examine critically reservoirs in volcanic rock, as a few have failed in such locations. Coarse-grained sandstone seems to be an object of suspicion and should be carefully examined.

3) Natural depressions are treacherous and should be examined with care, and if they are near deep canons or underlain with coarse material where water might readily escape, no superficial tightness will avail to make them effective.

847—Fertilizing Value of Ammonium Nitrate
—SCHOESING, TH. Jr., in *Le Progrès Agricole et viticole*, Year 35, No. 22, pp. 517-519. Montpellier, June, 1918.

Ammonium nitrate, hitherto little known by farmers because it has never been available in large quantities, will be able to be supplied liberally to them when no longer used for the purposes for which it is required under present circumstances. For this reason the author made tests of its fertilizing value by pot experiments. Maize seeds of equal weight were sown in each pot, which contained about 17 lb. of soil with an initial moisture percentage of 12.9, and 15 gm. bipotassium phosphate as basic fertilizer. Except in the two control pots the nitrogenous fertilizer added to each contained 3.37 gm. of nitrogen; four pots contained ammonium sulphate and four ammonium nitrate. The plants were cut down to the ground at the beginning of earing and the following average weights per pot of the air-dried crop were obtained:—Control pots, 87.6 gm.; pots with ammonium sulphate, 106.8 gm.; pots with ammonium nitrate, 108.4 gm. Ammonium nitrate thus gave an increase in the dried crop almost equal to that of ammonium sulphate.

The soil in the pots was kept very moist. It was found that, although nitric nitrogen fertilizers give slightly heavier crops than ammoniacal nitrogen fertilizers, there is little difference in yield in very wet years.

It is usually admitted that the nitrogen of ammoniacal fertilizers must be nitrified before it can be used by plants. Several workers (MUNTZ, MAZE, SCHLOESING JR.), have, however, shown that absorption occurs in the ammoniacal form as well as in the nitric one. The only difference is in the rate of absorption, a difference which might be explained by an influence of the absorbing properties of the soil on the ammonia. Till it is nitrified ammonia will also be less mobile. For this reason an excess of water, while favouring the equilibrium movements which cause the dissolution of new quantities retained in the soil in proportion as absorption progresses, exercises a very good influence in this case.

871—The Common Honey Bee as an Agent in Plum Pollination.—HENDRICKSON, A. H., in the *College of Agriculture, Agricultural Experiment Station, Berkeley, California, Bulletin* No. 291, pp. 215-236. Berkeley, January, 1918.

The results of these experiments, which are a continuation of those of the preceding year⁽¹⁾, may be summarized as follows:—

The average yield per tree of French

(Agen) plums was increased by the use of bees in the orchard, but there was no increase in the yield of the Imperial variety. The percentage of setting was greatly reduced for both varieties when all pollen-carrying insects were kept away from the trees. The percentage of setting in a French plum tree enclosed in a tent of mosquito netting with wooden supports alone or with an Imperial tree and a colony of bees was higher than the orchard average for the variety. An Imperial tree gave a good crop when alone in a tent with bees, but a slightly higher yield than the orchard average when enclosed with a French plum tree and bees. The French plum tree which had given a heavy crop in 1916 when enclosed in netting with bees, gave a very light crop in 1917 when left free. A plum tree which had given a small crop in 1916 when under a tent alone, gave, in 1917, a percentage of setting which was satisfactory although below the general orchard percentage. Both the Imperial trees which had given a small yield in 1916, gave heavy crops in 1917 under open orchard conditions. The percentage of setting of the French varieties was in inverse proportion to their distance from the Imperials.

The results of the two year's work led to the following conclusions:—

(1) Both French and Imperial plum trees set better if hives are placed in the orchard during the flowering period, provided the trees are in normal healthy condition.

(2) If there are no bees in the orchard the percentage of setting of these varieties may be low.

(3) The French plum does not absolutely require to be interplanted with the Imperial, though such interplanting may prove beneficial to both varieties.

LIVE STOCK AND BREEDING

875—Observations on Abortion Disease, in the United States.—SCHROEDER, E. C. and COTTON, W. E., in *The Journal of Agricultural Research*, Vol. XI, No. 1, pp. 9-16. Washington, April 2, 1917.

As far as the writers have been able to learn in their wide experience with the disease, the abortion bacillus is an obligatory parasite. It may live and retain its virulence for a long time in infected material expelled from the uteri of infected cows, but no data are available to support the belief that it can maintain itself or multiply under natural conditions as a saprophyte. Hence, the chronic persistence of the microparasite in the bodies of infected cows is probably the most important among the causes responsible for the propagation, the perpetuation, and wide prevalence of the disease.

The favourite habitat of the abortion bacillus in the bodies of cows is the udder,

⁽¹⁾ See also *Agriculture Gazette* November 1918, page 1101, No 649.

and the udder is seemingly its only habitat in the bodies of non-pregnant cows. One cow under test for 7 years gave abortion bacilli continuously in her milk. The bacillus was never found in the milk from a cow unless both her milk and her blood serum possessed agglutinating properties for it, but repeatedly cows were found which reacted, but the bacilli were not found in the milk. By experimental inoculation of a cow, the authors were able to demonstrate that the bacilli passed from the udder to the uterus. They believe that the abortion bacilli in ingested milk do not penetrate deeply or abundantly into a calf's body.

876—Contribution to the Study of the Mortality of Calves: Coli-bacillary Broncho-Pneumonia.—COMINOTTI, L., in *La Clinica veterinaria*, Year LXI, No. 7, pp. 167-173. Milan, April 15, 1918.

Under the general term of mortality ("moria") of calves various morbid forms are included that are classified differently by various authors. The predominating form, is, however, coli-bacillosis, though it appears under different clinical, anatomical and pathological aspects. The appended observations were made by the author during protracted researches.

Coli-bacillosis of calves may develop under the clinical, anatomical and pathological form of an acute broncho-pneumonia.

The articular form of coli-bacillosis may, in certain cases, represent a complication of the septicæmic form of uncertain course, owing to a secondary infection by common organisms.

Bacterium coli may cause nodular formations in the liver of calves, as was observed by LANGER for a bacillus of the sub-group *Enteritidis Paratifo* B., and by VALLÉE in pseudo-tuberculosis of calves.

883—Study of the Proteins of Certain Insects with Reference to their Value as Food for Poultry.—MCHARGUE, J. S., in the *Journal of Agricultural Research*, Vol. X, No. 12, pp. 633-637. Bibliography of 9 Publications. Washington, September 17, 1917.

THOMAS was the first to demonstrate experimentally that animal proteins are much superior to vegetable proteins in maintaining the nitrogen equilibrium of the animal body. He showed that the minimum daily quantities necessary to protect body protein from loss were:—meat protein 30 gm., milk protein 31 gm., rice protein 34 gm., potato protein 38 gm., bean protein 54 gm., bread protein 76 gm., maize protein 102 gm.

The author determined the percentage of growth-promoting acids in the proteins of two common insects—the June bug (*Lachnosterna* sp.) and the grasshopper (*Melanoplus* spp.) as compared with the percentage of proteins in roast beef and turkey white meat. He found the following values for each of the two insects respectively:—Ammoniacal, nitrogen, 8.96, 9.14; melanin, 6.78, 3.42;

arginin, 11.53, 14.98; histidin, 6.57, 5.62; cystin, 0.35, 0.23; lysin, 8.02, 8.04; amino nitrogen (in filtrate from bases), 50.80, 52.87; non-amino nitrogen (in filtrate from bases), 5.84, 4.32. There is, on the whole, a great similarity in the proteins from such different sources. There is a close agreement in the lysin and arginin contents of the two insects studied and beef and turkey meat. In the beef and turkey the percentage of cystin is almost double and that of histidin two to three times that of the insects.

The protein content of grasshoppers, killed by potassium cyanide, dried at 100° C., (212° F.) ground in a mortar, and kept in closed bottle for seven months, underwent no alteration, thus showing that the dried material can be kept indefinitely. An analysis of the dried matter gave the following percentages:—Protein, 75.28; ether extract, 7.21; crude ash, 5.61. Dried grasshoppers contain more protein than commercial meat meal and would probably be an excellent substitute for it in poultry feeding.

884—Utilization of Farm Wastes in Feeding Livestock in U. S. A.—RAY, S. H., in *U. S. Department of Agriculture, Farmer's Bulletin* 873, pp. 1-12. Washington, D.C., April, 1917.

More than $\frac{1}{3}$ of the total production of cereal straw in the United States is not used to advantage, and $\frac{1}{2}$ of this amount is a total loss, the value of which is estimated at more than \$100,000,000. In a three years' study of corn-belt cattle the Office of Farm Management found that the breeding herds maintained most largely on oat or wheat straw, maize stover, etc. (with a very small quantity of concentrated feed such as cottonseed meal, maize, etc.), returned the largest profits.

Of all the uses to which straw and maize stover may be put, the only really economical ones are as food or bedding, and, of these two, their use as food is by far the most satisfactory.

To prepare stover for feeding purposes it should be cut and shocked; it may be chopped or shredded if cheap power and labour are available, but otherwise the cost is disproportionate to the advantages gained. Waste is greatly decreased by shredding or cutting dry corn stover and putting it in the silo with water. Of all the methods, ensiling is the most economical. Straw and stover should be used in the fattening rations of all animals except hogs, and should compose the larger part of all winter or maintenance rations for cattle, sheep and horses. Breeding herds of beef cattle, and dairy cows do well on rations composed largely of these products; the same applies to ewes if some grain is added. Horses doing very light work or none at all need little grain if they have a liberal allowance of clean straw or stover. Rye straw should not be fed to dairy cattle, because of its toughness and the danger from ergot, and buckwheat straw,

on account of its low food value, should only be given when other roughages are not available. When barley straw is used the mouths of the cattle should be examined occasionally as the dry, stiff beards are apt to set up irritation.

The following rations are proposed for various classes of animals:—

BEEF CATTLE. Winter rations.—

- 1) Straw, 10 lb.; silage, 20 lb.; cottonseed or linseed meal, 1 lb.
- 2) Straw, 20 lb.; cottonseed or oil cake, 2 lb.
- 3) Straw, 10 lb.; maize fodder, 10 lb.; cottonseed or linseed meal, 1 lb.
- 4) Stover, 35 lb.; cottonseed or linseed oil meal, 1 lb.

Fattening rations (for 1,000 lb. steers).—

- 1) Straw, 5 lb.; silage, 18 lb.; maize, 12 lb.
- 2) Straw, 8 lb.; leguminous hay, 6 lb.; cottonseed or linseed cake, 5 lb.
- 3) Stover, 10 lb.; silage, 15 lb.; maize, 12 lb.
- 4) Straw, 5 lb.; stover, 15 lb.; maize, 6 lb.; cottonseed meal, 3 lb.

DAIRY CATTLE. Ration for dry cows, bulls and heifers.—

Maize stover and straw, unlimited; clover hay, 10 lb.; maize silage, 20 lb.; cottonseed meal, 1 lb.; maize-and-cob meal, 2 lb.

Ration for cows about to calve. —

Maize stover, 5 lb.; clover hay, 12 lb.; maize silage, 25 lb.; wheat bran, 3 lb.

Ration for cow giving 16 lb. of 4% milk.—

Maize stover and straw, unlimited; clover hay, 12 lb.; maize silage, 20 lb.; cottonseed meal, 2 lb.; maize-and-cob meal, 3 lb.

Ration for cow giving from 20 to 25 lb. of 4% milk.—

Maize stover and straw, unlimited; clover hay, 12 lb.; maize silage, 25 lb.; cottonseed meal, 2 lb.; maize-and-cob meal, 3 lb.; gluten feed, 3 lb.

SHEEP. (Supplementary rations with a little grain).—

- 1) Maize stover, 2 lb. (amount eaten, not amount fed); leguminous hay, 2 lb.
- 2) Oat straw, 2 lb.; leguminous hay, 2 lb.;
- 3) Oat straw or maize stover, 1 lb.; silage, 1½ lb.; leguminous hay, 2 lb.

HORSES. Maintenance rations for 1,000 lb. idle horse.—

- 1) Maize stover, 9 lb.; alfalfa hay, 3 lb.; maize-on-cob, 5 lb.
- 2) Oat straw, 8 lb.; alfalfa, 8 lb.; cane molasses, 3 lb.

Daily ration for 1,000 lb. horse at light work.—

Maize stover, 5 lb.; Bermuda hay, 5 lb.; cottonseed meal, ½ lb.; cowpeas, 2 lb.; shelled maize, 5 lb.

Daily ration for 1,000 lb. horse at heavy work.—

Maize fodder, 4 lb.; alfalfa, 12 lb.; ground soy beans, 1 lb.; shelled maize, 12 lb.

Daily rations for 1,250 lb. idle horse.—

- 1) Maize stover, 11 lb.; alfalfa, 5 lb.; ear maize, 4 lb.
- 2) Oat straw, 10 lb.; pea hay, 4 lb.; com-

mon beets (or other roots or silage,) 4 lb.; oats, 4 lb.

Daily ration for 1,250 lb. horse at light work.—

Barley straw, 5 lb.; alfalfa hay, 6 lb.; rolled barley, 8 lb.

Daily ration for 1,500 lb. idle horse.—

Maize fodder (with ears), 18 lb.; alfalfa, 5 lb.

886—Oatless Rations for Draught Horses.—

DECHAMBRE, M. P., in *Comptes rendus des Séances de l'Académie d'Agriculture de France*, Vol. IV, No. 15, pp. 480-497. Paris, May 1, 1918. (2 pp. in Institute Bulletin.)

887—Winter Steer Feeding Experiments in

Indiana, U. S. A.—SKINNER, J. H. and KING, F. G., in *Purdue University Agricultural Experiment Station Bulletin No. 206*, Vol. XX, pp. 1-28. Lafayette, Indiana, September, 1917. (4 pp. in Institute Bulletin.)

888—The Relation of the Quality of Proteins

to Milk Production.—HART, E. B. and HUMPHREY, G. C.: I. with the co-operation of SCHAAAL, A. A. II. with the co-operation of SURE, BARNETT, in *The Journal of Biological Chemistry*, Vol. XXVI, No. 2, p. 457-471, September, 1916; Vol. XXXI, No. 2, pp. 445-460, August, 1917, Baltimore, Md.

FARM ENGINEERING

891—Electricity in Agriculture: Consump-

tion, Distribution and Ploughing.—TARCHETTI, A., in *Il Giornale di Riscicoltura*, Year VIII, No. 2, pp. 25-30, No. 3, pp. 41-46. Vercelli, February 28 and March 31, 1918. (2 pp. in Institute Bulletin.)

892—The Transformation of Motorcars and

Motor-lorries into Agricultural Tractors and Windlasses (Landrin System).—FREMIER, V., in *Le Génie Rural*, Year X, No. 81, pp. 9-10. Paris, 1918.

893—A Study of the Plough Bottom and

its Action upon the Furrow Slice.—WHITE, E. A. in the *Journal of Agricultural Research*, Vol. XII, No. 4, pp. 149-182. Washington, January 28, 1918.

894—The Russell Turnip Thinner.—The

Implement and Machinery Review, Vol. XXXIV, No. 517, p. 72 London, May 1, 1918.

There exists no turnip thinner that leaves only a single plant, but with a good machine, it is possible to leave a very small bunch of plants at regular intervals. A satisfactory machine which has proved its worth has been constructed by the MALDEN IRON WORKS Co., Ltd., Maldon, Essex. It may be used for thinning roots in general.

The RUSSELL thinner is provided with a serrated cutter, which can be quickly adjusted

to leave very small or large bunches of plants. The thinning apparatus is nicely balanced, and is entirely under the control of the man working the machine. If the crop is patchy, the attendant can lift the cutters so that plants required to be left in are not taken out. The machine is fitted with 5 speeds, for gapping 8, 10, 12, 14 or 16 inches, whilst the cutting apparatus and road wheels are arranged to slide along the axle to suit varying widths of row.

896—Safety Devices for Chaff-cutters.—

I. MASSARELLI, F., in *La sicurezza e l'Igiene nell' Industria*, Year III, No. 6, pp. 131-147. Milan, December 31, 1916.—

II. BERTONI, C., in *Il Coltivatore*, Year LXIV, No. 1, pp. 6-10, Casale, January 10, 1918.

The author considers fly-wheel chaff-cutters, which are the most used, and the means of preventing the accidents that are so common with these machines. These accidents can be classified as:—a) accidents due to the fly-wheel; b) accidents due to the feed rollers, c) accidents due to the gearing and drive in general. The safety devices applied to chaff-cutters are based on two different principles:—

(1) Devices stopping or changing the movement of the feed rollers and platform by quickly moving suitable mechanisms by the hand or foot. The devices, though improving, the working qualities of the machine are only relatively efficacious, as they are rather *attenuating* than *preventive* devices and should be supplemented by others.

(2) Devices, automatic or not, that make it impossible to pass the arm or hand beyond a certain limit into the mouth where the forage enters. For hand-driven fly-wheel chaff-cutters, the author describes guards, made of wood, cast-iron, sheet iron, or grating. As regards protection against accidents that might happen when feeding the machine, a board, fixed on the edge of the hopper, and of sufficient length, will prevent the arm passing beyond a safe limit.

One of the essential conditions for the safety of machine-driven chaff-cutters is that there should be both a fixed and free pulley together with the disengaging gear that is so often lacking in the older machines. It should be so made that the belt cannot suddenly slip from the free on to the fixed pulley and thus start the machine. A lever disengaging gear mounted on a bracket is very suitable for belt-driven chaff-cutters, which should have a guard for the fly-wheel and a lattice protecting the knives.

This lattice, even when lowered on the feed-trough, allows the workman to see the position of his hands and watch the work more closely, and as it is connected by a lever to the side mechanism controlling the cylinders and feed platform, if the workman's hands happen to pass into a dangerous position, the lattice lifts, thus stopping or reversing the movement.

900—Rapid House Construction with Concrete Studs.—*Engineering News-Record*, Vol. LXXX, No. 13, pp. 604-606 + 3 Figs. + 2 plans. New York, March 28, 1918.

The description of a new method of house construction with fireresistant walls made of cement stucco on metal laths.

RURAL ECONOMICS

901—Study of Some Egyptian Farms.—

BAROIS, C., in *Comptes rendus des Séances de l'Académie d'Agriculture de France*, Vol. IV, No. 13, pp. 417-427. Paris, April 10, 1918. (3 pp. in Institute Bulletin).

The author describes some capitalist farms in Egypt with the intention of pointing out to the French public the advantages capitalist colonial enterprise, if well managed, may offer to French investment. The following is a summary of the descriptions of five farms given in the original Institute Bulletin:

Kom-Ombo Farm.—Consists of 32,000 acres on the banks of the Nile, 500 miles south of Cairo. It was desert land, never reached by the waters of the river, and it was necessary to install a system of irrigation costing nearly \$5,000,000. The land is cultivated either by the tenants for cereals, or in conjunction with the fellahs and the company for these crops and for cotton, or directly for sugar cane. In 1916 the cultivation of sugar cane which covered 27% of the area cultivated brought a gross profit of \$750,000 compared with \$390,000 from all the other crops together.

Cheikh Fadl Farm.—Situated in central Egypt, contains 9,200 acres and must be irrigated by pumping. All the land is let out to farmers. Besides cereals, beans, corn and clover, the principal crop is sugar cane. Each year the company pays its shareholders 5½%.

Ouady Toumilat Farm.—An estate of 21,250 acres in a hollow in the desert between the Delta and the Suez Canal. The land which had deteriorated owing to infiltration from a large public canal has been largely reclaimed for cultivation and is now being profitably worked.

Sakha and Santia Farms.—Two estates with abundant yields situated in the best part of the Delta. The profits per acre in 1912 were \$15 and \$35, respectively.

The author urges that such enterprises should not be entered into before the subject has been thoroughly studied and numerous extensive experiments made.

902—Studies in the Cost of Market Milk Production in the United States.—

ANDERSON, A. C. and RIDDELL, F. T. in *The Journal of Dairy Science*, Vol. I, No. 2, pp. 181-184. Baltimore, July, 1917.

The data presented in these studies cover a period of two years, from 1914 to 1916, and

include figures from 25 farms near Grand Rapids, Michigan. Most of the other figures secured on this point in the United States were collected in New England or Atlantic Coast States. The data were secured by a one day visit to each farm monthly. All the farms visited, produced market milk, some

of them being dairy farms solely, although most of them were coupled with grain, vegetables, live stock or fruit production, and each farm was conducted according to the ideas of the owner or operator. The average expenditures of the farms visited were as shown in Table I.

Items of expenditure	1914	1915
Total number of farms.....	25	25
Average number of cows per year.....	459.4	428.57
Man labour.....	\$ 28.68	27.19
Hauling milk and other horse labour.....	15.54	14.77
Feeds:		
Roughage.....	31.02	30.38
Concentrates.....	28.61	26.68
Pastures.....	8.36	7.66
Cash sundries.....	1.96	1.77
Veterinary services and drugs.....	0.86	0.99
Taxes, interest and depreciation on herd.....	9.88	9.49
Taxes, interest, insurance and depreciation on buildings.....	8.72	10.33
Depreciation on barn tools and dairy utensils.....	0.50	0.48
Actual losses on live stock.....	1.95	6.25
Added earning power of owner due to knowledge, experience, and interest in excess of that possessed and used by ordinary labour.....	6.00	6.00
Added risk due to instability of market for product as whole milk, which in single years amounts to 30 per cent, and in one year out of every five would be 6 per cent.....	8.47	8.30
Total.....	150 57	150 29

The average receipts of the farms visited, for the dairy, were as shown in Table II.

The authors bring in a new point, that of "instability of market for product as whole milk" which in a single year may amount to

30 per cent and occurs, as they estimate, one year in five, which would be 6% of the total cost of production in this case \$8.47 for 1914, and \$8.30 for 1915.

Items of receipts	1914	
Average pounds of milk produced.....	6 928 lb.	7 156.8 lb.
Gallons of milk produced.....	834.70 gal.	862.3 gal.
Average price per gallon delivered into Grand Rapids.	16.90 cent.	16.35 cents.
Value of milk produced.....	\$ 141.35	\$ 139.01
Credit by manure.....	17.45	17.59
Total value of products per cow.....	158.80	156.60
Net profit per cow.....	8.23	6.31
Cost of production per gallon.....	15.90 cents	15.39 cents.
Net profit per gallon.....	1.0 cents.	0.7 cents
Cost of production and delivery per hundred pounds.....	\$ 1.916	\$ 1.854
Cost of production per quart.....	3.475cents.	3.848cents.

The investment on the farms studied, expressed in percentage is as follows:—

Investment in cattle.....	45%
Investment in buildings.....	54%
Investment in equipment.....	1 "

For 1915 the distribution of cost factors was as follows, expressed in percentage:—

Grain.....	17.8%
Roughage.....	20.2
Pasture.....	5.1
Hauling milk.....	9.8
Man labour.....	18.1
Market losses.....	5.5
Taxes, interest and depreciation on buildings.....	6.9
Same on cows.....	6.3
Losses on cows (tuberculosis, etc.).....	4.1
Management.....	4.0
Depreciation on tools, etc.....	0.3
Veterinary services.....	0.7
Cash items.....	1.2

The authors point out that during the last two years the cost of labour has increased 25%, concentrated feed 30 to 35%, roughage 10%, and minor supplies and milk room equipment 25 to 60 per cent.

AGRICULTURAL INDUSTRIES.

903—The Intrinsic Values of Grain, Cottonseed, Flour and Similar Products, Based on the Dry-Matter Content.—BOERNER, E. G., U. S. Department of Agriculture, Bulletin No. 374, pp. 1-32. Washington, D.C., October 17, 1916. (2 pp. in Institute Bulletin.)

905—The Beet Sugar Industry in the Netherlands.—GOOSSENS, G., in *In en Uitvoer*, Year III, Nos. 7 and 9, pp. 151-

152 and 200-202. Antiverp., February 13 and 27, 1918.

906—**The Fat of the Residue of the Decoration of Rice.**—GARELLI, FELICE, in *Annali della R. Accademia d'Agricoltura di Torino*, Vol. LX, p. 132-139. Turin, 1917.

909—**Preliminary Note on Certain Changes in Some of the Nitrogenous Constituents of Milk Caused by Bacteria.**—SUPPLEE, G. C., in *The Journal of Dairy Science*, Vol. I., No. 4, pp. 313-319. Baltimore & London, November, 1917.

911—**Methods Adopted in the Production of "Clotted Cream" in Devonshire and Cornwall, England.**—SADLER, W., in the *Journal of Dairy Science*, Vol. I, No. 4, pp. 291-302. Baltimore & London, November, 1917.

Enquiries have been conducted on behalf of the Board of Agriculture as to the methods adopted by the producers of "clotted cream" in the counties of Devonshire and Cornwall in England. Experiments have subsequently been undertaken at the Midland Agricultural and Dairy College, Kingston, Derby.

The results of these experiments so far tend to show:—

1) That provided a suitable system be adopted and reasonable care be taken in management and manipulation, clotted cream having the typical and characteristic properties can be produced in any district.

2) That, while a rich milk is preferable, it is not essential for the production of characteristic clotted cream to have only the breeds of cattle favoured by the producers in Devonshire and Cornwall.

3) That the flavour and keeping properties of the cream are problems of a bacteriological nature.

4) "Scalding" for 20 to 30 minutes with a final temperature of 187° F. proved to be a satisfactory procedure.

5) One pound of clotted cream was produced from 23 pounds of milk.

6) The average percentage of butterfat in the clotted cream was 62 to 64 per cent.

7) The average butterfat content of the scald milk was 0.75 per cent.

912—**Studies in Butter Shrinkage.**—GUTHRIE, E. S., in the *Journal of Dairy Science*, Vol. I, No. 2, pp. 136-138. Baltimore, July, 1917.

The Dairy Division of the Cornell University has completed the storage studies of 100 tubs of butter. This butter was made in eight different churnings from sweet pasteurised cream. The body was good and the moisture was nicely incorporated. All the butter was overworked somewhat, which has a tendency to complete the incorporation of the water. The tubs were paraffined, and were weighed just before the butter was packed in them. The butter was weighed on November 20 after being in cold storage for

134 days at 0° to 10° F. The shrinkage or increase in weight was determined for each tub.

Seventeen packages showed an increase in weight ranging from 0.5 ounce to 27.5 ounces. Eighty three tubs showed shrinkage which varied from 0.5 ounce to 15.5 ounces. The total shrinkage was 377.5 ounces. The total increase of weight was 85 ounces. The net shrinkage was 292.5 ounces, or 18.28 pounds, which is 0.1828 pound for tub or 0.29 per cent.

913—**The Relation of *Oidium lactis* and *Penicillium* to the Keeping Qualities of Butter.**—COMBS, W. B. and ECKLES, C. H., in the *Journal of Dairy Science*, Vol. I, No. 4, pp. 347-355. Baltimore and London, November, 1917.

914—**Varieties of Cheese: Descriptions and Analyses.**—DOANE, C. F. and LAWSON, H. W., in *U. S. Department of Agriculture, Bulletin No. 608*, pp. 80 + Bibliography of 103 Publications. Washington, March 6, 1918.

This bulletin gives descriptions of 287 different cheeses and analyses of 129 varieties extracted from the books and technical periodicals of the producing countries. The varieties are arranged in alphabetical order. It is pointed out that one type of cheese is frequently known under different names, thus making classification difficult.

915—**Study on the Normal Production of Gas in Cheese: Investigations at the Agricultural Experiment Station at Hoorn, Netherlands.**—BOEKHOUT, F. W. and VRIES, J. J. OTTIDE, in *Verslagen van Landbouwkundige Onderzoekingen de Rykslandbouwproufstations* No. XXI, pp. 14-28 + 1 Plate. The Hague 1917.

916—**The Growth of Green Mould (*Penicillium glaucum*) for the Manufacture of Blue Cheeses.**—CHAVASTELON, R., in *Comptes rendus des Séances de l'Académie d'Agriculture de France*, Vol. IV, No. 18, pp. 564-566. Paris, May 22, 1916.

920—**The Influence of Salt on the Changes Taking Place in Storage Butter.**—WASHBURN, R. M. and DAHLBERG, A. C., in the *Journal of Dairy Science*, Vol. I No. 2, pp. 114-126. Baltimore, July, 1917.

It is generally believed, and most experimental evidence supports this belief, that salt improves the keeping quality of butter. It has been observed, on the other hand, that unsalted butter in commercial cold storage keeps as well as or better than salted butter.

The experiment reported in this paper deals with this point and considers only salted versus unsalted butter. The butter was first held for the usual cold storage period in a commercial cold storage butter room and was then held for a short time at the usual ice box temperature. This latter

treatment is comparable to that which commercially stored butter would receive before being consumed. At each scoring the usual bacteriological and chemical analyses were made so that probable causes of a possible difference would not be overlooked.

Making, Storing, and Scoring the Butter.—The cream used was sweet, clean cream of good flavour. It was ripened without pasteurization on the addition of a starter to an average acidity of 0.58 per cent lactic acid. It churned in 20 to 30 minutes; the churning was stopped at the wheat kernel stage; the butter was washed twice, salted or not, and worked from 23 to 27 revolutions in a Victor double roller churn. Half the butter of each churning was salted and worked and the other half worked unsalted so that each sample of unsalted butter had an exact duplicate in the salted butter. It was then packed into 5 pound paraffined wooden butter drums lined with parchment paper. Enough of these containers were packed so that one from each lot could be taken out at every scoring. Initial data as to score, chemical and bacteriological analysis were obtained. The butter was stored in a commercial butter storage room in St. Paul, at a temperature of -15° F. After 284 days in cold storage it was held for twenty days in a butter-cutting room at 58° to 60° F.

The following points were studied:—Influence of salt on score; influence of salt on bacterial activity; influence of salt on acidity; influence of salt on moisture, protein content; relation of score, acidity and bacteria in salted and unsalted butter. The following facts were brought out:—

Salt, exclusive of its antiseptic property, hastened the deterioration of the butter.

When stored at -15° F. unsalted butter kept as well as salted butter.

The bacteria in the unsalted butter decreased more rapidly at -15° F. than they did in the salted butter and increased more rapidly at 58° F.

The acidity of the unsalted and the salted butter increased uniformly at -15° F. but at 58° F. the increase was greater in the unsalted butter.

Moisture was lost from the salted butter, but not from the unsalted kept at -15° F.

Little if any relationship existed between the bacteria, the acidity, and the score in this butter.

INJURIOUS VERTEBRATES

949—The Control of Field Mice by Acetylene Gas.—(PAPAGEORGIOU, P.) in *Bulletin of the Royal Hellenic Society of Agriculture*, Vol. X, No. III. pp. 3179-3182 + 1 Fig. Athens, 1918.

The author reports the very satisfactory results obtained by him at the Agricultural Station of Thessaly with a new acetylene gas method for destroying field mice. In many parts of the vast cereal-producing plain of Thessaly field mice, aided by favourable conditions, have multiplied so considerably that they are a serious menace to the coming harvest. In the absence of other chemical products, such as strychnine, carbon bisulphide, etc., the author applied calcium carbide, produced in large quantities by a local firm working a water fall at Gorgopotamos, near Lamia. Small pieces of calcium carbide the size of a pea are placed in the holes dug by the mice, a little water poured in and the holes stopped up. The mice are suffocated by the gas. If new holes open in two or three days the procedure is repeated. The method is harmless to those using it, easy to apply, and cheap.

AGRICULTURAL ECONOMICS

AGRICULTURAL CO-OPERATION IN SCOTLAND

THE BEGINNING OF CO-OPERATION

While Ireland led the way in the United Kingdom in the co-operative organization of agriculture, England and Wales came second and Scotland was last. The tradition of Scottish agriculture is strongly individualistic, and its achievement—the success which has attended the long and patient efforts to extend the area of cultivation, and the standard maintained both in arable farming and in the breeding and feeding of live stock—has produced a legitimate pride in individual enterprise and skill. Common action has not however been entirely wanting. There have been numerous farmers' clubs and societies, many of them existing for the purpose of holding annual shows which

encourage the improvement of stock and of crops. The long-established Highland and Agricultural Society has the first place among these. The more recently founded Scottish Chamber of Agriculture is the most important of other associations which aim at promoting the general political and social interests of the farming community.

Co-operative trading was little practised by the Scottish farmer until the early years of the twentieth century. At that time agriculture was recovering, in Scotland as in England, from the depression of the nineties. The bad years had made prominent the difficulties inherent in an industry carried on by a multitude of relatively small enterprises. There were the difficulty due to the high cost of materials procured in

small quantities, the difficulty of obtaining guarantees of the cost of these materials, the difficulty of finding a market for perishable produce, the difficulty of obtaining credit from the existing banks, the difficulty of the relatively high cost of insuring live stock. All these obstacles to prosperity affected most the small farmer, especially the small farmer in a remote district.

In 1904 a Scottish Agricultural Commission visited Denmark, and its subsequent report dealt largely with the success which Danish farmers have achieved by co-operating in the preparation and sale of their produce and the purchase of their requisites. They have fostered this success by a system of agricultural education which is closely associated with co-operation. The report bore fruit at a meeting held on January 18, 1905, under the auspices of the Scottish Chamber of Agriculture when a committee was appointed to "formulate a scheme for extending the benefits of co-operation to Scottish agriculturists, with powers to take such action as may appear expedient for giving the same practical effect". The result was the foundation of the Scottish Agricultural Organization Society.

THE SCOTTISH AGRICULTURAL ORGANIZATION SOCIETY

Constitution and Finance.—The Scottish Agricultural Organization Society was founded on October 25, 1905. It is a purely propagandist body. It devotes itself to the formation and encouragement of local co-operative societies, but does not itself engage in trade, nor does it concern itself with the general social or political interests of the agricultural community.

A guaranteed fund of £1000 was subscribed when the society was founded, and active steps were taken to ensure that there should be such a membership as would cause annual subscriptions to provide a considerable fund. Every member of the society, whether an individual or a body corporate, must hold one fully paid-up share of £1. If a member is a landowner he subscribes at least £1 a year, otherwise at least 5s. a year. Additional money was raised by means of a special donation fund, to which most of the contributors were landowners and which was brought up to £1000. In its early years the society was supported wholly by the subscriptions and by voluntary contributions, and the guarantee fund was annually drawn on to the extent of quite £500. In view however of the national importance of the work the Development Commissioners made in 1911 a grant of half the total expenses which the society incurred in each year. At first this grant was paid through the Scottish Education Department, but in 1912 its administration and the consequent supervision of the society's affairs were transferred to the newly constituted Board of Agriculture for Scotland. In 1916 the grant amounted to £648.

The affairs of the Scottish Agricultural Organization Society are managed by a president, a vice-president and an executive committee; and it is a condition of the government grant that this committee include two representatives appointed by each of the three colleges of agriculture and one appointed by the chairman of the county councils of crofting counties. There is a secretary who acts as general organizer; and in 1913 there were also a chief assistant organizer, an assistant organizer, and a special organizer whose work was connected with fishermen's co-operation. In 1914 a special grant was made by the Development Commissioners for the appointment of a Gaelic speaking assistant organizer to work in the Hebrides. The war has greatly depleted the staff.

A special Highland branch of the society was founded in 1908 to promote the co-operative movement in the north and north-west. It has its headquarters at Inverness. Branches of this type have been set up from time to time in other parts of the country.

The Scottish Agricultural Organization Society itself and all the societies affiliated to it are registered under the Friendly Societies Act and have limited liability. Each affiliated society is an independent unit, but the steps preliminary to its formation are guided by the parent society, which also provides for the auditing of its books and, if necessary, for the instruction of its secretary and treasurer in the required methods of book-keeping.

B. The Affiliated Societies.—In pursuing its aims the Organization Society at first met with many obstacles. The conservative and critical spirit of Scottish farmers was reinforced by the active opposition of the local dealers who found their position as middlemen between the farmers and the manufacturers and merchants threatened. Generally speaking the occupiers of medium sized farms, the small holders and the crofters carried on the business both of purchase and of sale with these dealers and the results were on the whole unsatisfactory. Credit was given for a year or longer and in the remoter districts a system of barter was very prevalent.

Gradually the society gained public confidence and in the thirteen years of its existence it has achieved a noteworthy success. Among the local societies it has organized are:

Poultry and Purchasing Societies.—At the end of 1917 there were 70 of these societies. In 1912 the Scottish Farm and Poultry Produce Federation, Ltd., was formed to act as a marketing agency for the co-operative societies. It keeps the local societies constantly informed as to price.

Co-operative Dairies.—The Organization Society appointed, soon after its foundation, a special dairy committee to consider the matter of co-operation among dairy farmers. The district of North Ayrshire was chosen

for experiment, and in 1917 there were seven dairy associations formed into a federation to advance their common interests. Kilmaurs Dairy Association, Limited, affords a good example of a well conducted co-operative dairy. Its depot was largely built and equipped with the money provided by members, some loans being also received from local landowners. The members hold 1,504 shares, and 5 per cent is paid on the paid up share capital. The total average cost of handling the milk is 0.66 of a penny per gallon.

Stock-breeding Associations.—In recent years many local stock-breeding associations have been formed, generally in connection with the schemes of the Board of agriculture for improving the breeds of horses and cattle, and without doubt they have been encouraged by the popularization of the co-operative principle for which the Organization Society is responsible.

The Organization Society has also formed fifty purchase societies, one fishery society, one credit society, and one bee-keeping society.

THE ECONOMIC SITUATION IN ARGENTINA

The year 1917 has not sensibly improved the Argentine economic situation. The defective harvest of 1916-1917 was a handicap in the first months of the year, and subsequent difficulties of various kinds impeded the progress of business in the country; the rarefaction and costliness of means of maritime transport much hindered the realization of the value of products; strikes among the employees of railways and factories were obstacles to the exercise of a spirit of enterprise; and the uncertainty of the political situation contributed to a similar state of affairs. But although the improvement of business in Argentina was not what it might have been it yet made itself felt in the latter part of the year, thanks to the prospect of a 1917-1918 grain harvest better as regards quantity and value than that of preceding years, and thanks to the flourishing condition of stockfarming of all kinds. The products of stockfarming—meat, wool and leather—reached very high prices when they were exported, and this ensured a balance of trade in favour of the country and gave it large available financial resources. Consequently the percentage of gold which guaranteed the paper circulation

reached 75, and this had a very favourable influence on the Argentine exchange.

Since the year 1917 has closed this improvement in the situation of the country has been accentuated. There has been a fine grain harvest almost throughout the cultivated territory. Agreement between the Argentine and various other governments for the purchase by the latter of this harvest, and for exporting and handling it, have secured that its value will be realized in good conditions and have eliminated all risks of a speculation injurious to the products market and the rate of exchange.

It can be asserted already that the uneasiness which prevented the resumption of business in Argentina is being dissipated gradually; and it may be anticipated that it will completely disappear and will give place to a new era of activity so soon as international relations have returned to their normal course. The important financial resources which are constituted by the unemployed capital accumulated in banks, and which amounted on the 31st of last December to nearly five thousand million francs, will revert to land business and agriculture, the only investments which Argentines appreciate.

CONTENTS OF THE INSTITUTE ECONOMIC BULLETIN

In addition to those already dealt with herein, the following is a list of the more important subjects treated in the June number of *The International Review of Agricultural Economics*. Persons interested in any of the articles in this list may obtain the original bulletin on application to the Institute Branch, so long as the supply for distribution is not exhausted:

	Pages
Agricultural Co-operation in South Africa.....	452-457
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AGRICULTURAL STATISTICS

FOOD PROSPECTS UNDER PEACE CONDITIONS

BY T. K. DOHERTY, LL.B.

Heretofore, in discussing the food questions, much attention has been given to wheat. However, following the rise in price there has arisen a greater demand for the cheaper cereals as substitutes. Hence the keen interest in examining the supplies of other food and feed crops. The cereals other than wheat are of present concern, not only because of their greater direct utilization recently as human food, but because of their indirect contribution thereto through being fed to animals. Therefore, there is in this article an attempt to take, in respect to these cereals, an inventory of the world's production and to estimate the world's present and prospective consumption and trade in each case, comparing recent data with the data officially ascertained on an average of five years immediately preceding the outbreak of the war. Fuller details are given in regard to the North American cereal situation, and there is incidentally some reference to live stock and population in so far as they have a direct bearing on cereal production.

The "Statistical Notes on Cereals," published by the International Institute of Agriculture, in April and October, afford excellent data for such consideration, and for comparing recent conditions with those prevalent before the war. The pre-war period may be taken as representing the normal state of international trade towards which there will now be a strong tendency to revert. Let us first take up the pre-war period.

These "Statistical Notes" of the Institute are for this period comparatively complete, and cover nearly all the countries whose trade is of importance. They relate to wheat, rye, barley, oats and maize, particularly for the five year pre-war average. These five cereals are presented together in two groups, according as each country shows a net import or a net export balance. They are also considered separately for the countries closed to commerce, viz.: Germany, Austria-Hungary, Bulgaria, Belgium, Roumania and Russia.

TABLE I.—Average Net Imports of Cereals for the Years 1909-10 to 1913-14.
(Thousands of bushels)

Countries.	Wheat	Rye	Barley	Oats	Corn	Total for Five Cereals
Great Britain and Ireland	216,000	.....	48,200	62,300	80,700	407,200
France	43,700	3,100	6,000	27,900	19,700	100,400
Italy	53,300	.....	900	7,800	14,600	77,400
Netherlands	22,000	11,400	11,000	7,800	21,700	73,900
Switzerland	16,900	800	900	11,700	3,900	34,200
Norway	3,700	10,200	4,600	500	1,200	20,300
Denmark	6,200	8,300	.....	4,500	11,800	30,800
Spain	6,200	.....	.....	.....	9,800	16,000
Sweden	7,000	3,900	.....	4,500	1,600	17,000
Egypt	7,700	.....	900	.....	400	9,000
Japan	4,000	.....	.....	.....	.....	4,000
Other Countries	98,100	16,100	(a) 11,900	.....	1,600	103,900
Totals	484,800	54,600	60,600	127,100	167,000	894,100

(a) Net exports.

TABLE II.—Average Net Exports 1909-10 to 1913-14.
(Thousands of bushels)

Countries	Wheat	Rye	Barley	Oats	Corn	Total for Five Cereals
Argentina	(b) 83,000	400	900	38,900	124,800	248,000
United States	106,900	800	8,300	3,900	36,200	156,100
Canada	94,800	.....	5,500	15,600	(a) 10,600	105,300
Australia	(b) 53,300	.....	.....	.....	(a) 400	52,900
India	(c) 49,600	.....	.....	.....	.....	49,600
Algeria	5,100	.....	5,000	3,900	(d) 400	13,600
Chili	1,100	.....	900	2,600	.....	4,600
Tunis	(a) 700	.....	2,800	2,600	(a) 400	4,300
New Zealand	400	.....	.....	1,300	.....	1,700
Uruguay	700	.....	.....	.....	.....	700
Totals	394,200	1,200	23,400	68,800	149,200	636,800

(a) Net imports.

(b) Years 1909-13.

(c) April 1st to March 31st.

TABLE III.—Average Net Imports and Exports of Countries Closed to Commerce 1909-10 to 1913-14

(Thousands of Bushels)

Countries	Wheat	Rye	Barley	Oats	Corn	Total for Five Cereals
<i>Net imports</i>						
Germany.....	68,300	(a) 26,400	149,300	3,200	31,900	226,300
Belgium.....	49,200	4,700	15,100	7,800	17,300	94,100
Austria-Hungary.....	10,700	(a) 1,200	(a) 7,400	1,900	15,000	19,000
Total imports.....	128,200	(a) 22,900	157,000	12,900	64,200	339,400
<i>Net exports.</i>						
Russia.....	164,200	27,900	173,200	65,500	28,000	458,800
Roumania.....	53,600	3,900	17,900	9,100	44,900	129,400
Bulgaria.....	11,000	2,000	1,800	.....	9,100	23,900
Total exports.....	228,800	33,800	192,900	74,600	82,000	612,100

(a) Net exports.

For the five cereals collectively the pre-war average net imports were 1,233,500,000 bushels and the pre-war net exports were 1,248,900,000. For the open countries the average net imports were 894,100,000 bushels, while the average net exports were 636,800,000; so that before the war the importing countries, at present open to trade, obtained 257,300,000 bushels of their requirements from countries as yet closed to trade, viz.: Russia, Roumania and Bulgaria. Of the closed countries Germany, Belgium and Austria-Hungary required from abroad 339,400,000 bushels, and the exports from Russia, Roumania and Bulgaria were sufficient to supply this demand and to furnish 257,000,000 bushels of the supplies required by the open countries, besides what was imported from overseas. If production and consumption had remained the same as they were on the average of the five years before the war, the importing open countries would now be 257,000,000 bushels per annum short of their requirements of these five cereals taken together. This shortage has since had to be made up by larger importations from overseas.

Of course Belgium will, as before the war, obtain the bulk of her 50 million bushels of wheat from this side of the Atlantic, but, from the data which will be adduced later, it will appear that the 339 million bushels, even if available between now and August 1st next for export from Russia and the Balkans, will be far from furnishing the normal supplies formerly needed by the central German States. Since Russia's collapse in 1917 the Germans have made strenuous efforts to restore normal import conditions. The dislocation and civil strife arising from Bolshevism in Russia are interfering with production and retarding

that restoration. The Germans can probably buy their supplies from that source more profitably than elsewhere, because they have manufactured products to sell which the Russians badly need. Through such reciprocal trade they would overcome the handicap presented by the worthless Russian currency and lack of gold. The return cargo on the grain carrying trains would facilitate the transportation problem. They would thus strive to regain their former economic supremacy. They would work to that end with all the more energy and determination because of the hate of the Allies and because of the disinclination of the Allies to trade with them and especially to supply them with the food which they now claim they urgently need. On the other hand, the Southern Russians and the Ukrainians in particular can reach Western European markets through the Port of Odessa and the Dardenelles, and it is not improbable that they will by this route export considerable quantities of cereals from next season's crops. It is improbable that any considerable quantity will be available from stored grains for immediate shipment.

In the pre-war period the closed importing countries produced an annual average of 2,407,500,000 bushels of the five cereals. Their average annual imports for the same period were 339,400,000 bushels (Table III) making their total annual average consumption 2,746,900,000. Observe the preponderance of the rye crop shown in Table IV, especially for Germany and Russia. Now will naturally follow a comparison of the preceding data with those of 1917-18 in so far as these are now available. Table V gives the net exports of the exporting countries open to commerce.

TABLE IV.—Average yield for the five years ending 1913.

(Thousands of bushels)

Recent statistics are not yet available for the closed countries, but their pre-war average yield of these five cereals was as follows:—

Closed countries	Wheat	Rye	Barley	Oats	Corn	Total Five Cereals
<i>Importing Countries</i>						
Germany.....	150,900	444,900	151,600	557,600	.....	1,305,000
Belgium.....	14,700	23,600	4,600	38,900	27,600	109,400
Austria Hungary.....	231,500	161,400	151,600	239,900	208,700	993,100
Total.....	397,100	629,900	307,800	836,400	236,300	2,407,500
<i>Exporting countries</i>						
Russia.....	815,700	921,200	505,200	1,024,500	86,600	3,353,200
Roumania.....	88,200	3,900	23,000	26,000	106,300	247,400
Bulgaria.....	44,100	7,900	13,800	6,500	.....	72,300
Total.....	948,000	933,000	542,000	1,057,000	192,900	3,672,900
Grand total.....	1,345,100	1,562,900	849,800	1,893,400	429,200	6,080,400

TABLE V.—Total Exports, 1917-18

(Thousands of Bushels.)

Countries	Wheat	Rye	Barley	Oats	Corn	Total for Five Cereals
Argentina.....	84,464	.....	565	17,617	35,191	137,837
United States.....	135,314	12,540	27,654	111,197	38,793	325,498
Canada.....	169,040	1,114	6,635	39,826	(a) 7,004	209,611
Australia.....	38,224	.....	.....	.....	.....	38,224
India.....	14,008	.....	.....	.....	.....	14,008
Algeria.....	2,054	.....	1,757	5,233	4	9,048
Totals.....	443,104	13,654	36,611	173,873	66,984	734,226

(a) Net imports.

For the cereals other than wheat the figures for Argentina and Australia refer to the calendar year, and those for India to the year ending March 31st.

TABLE Va—Monthly Exports of Wheat

(Including Flour for Canada and United States)

(Thousands of bushels)

	Canada	United States	India	Australia	Argentina	Total for five Countries
1917-18						
August (1917).....	18,698	9,739	3,004	8,164	720	40,325
September.....	6,154	7,182	1,724	4,236	1,600	20,896
October.....	17,174	11,483	860	3,080	928	33,525
November.....	29,191	10,614	600	1,852	2,048	44,305
December.....	33,756	15,315	1,020	2,532	1,856	54,479
January (1918).....	8,491	12,442	612	2,260	2,904	26,709
February.....	9,574	10,502	688	2,004	3,080	25,848
March.....	13,500	12,208	1,224	3,000	8,160	38,092
April.....	11,074	12,364	840	2,144	13,992	40,414
May.....	7,567	10,915	1,000	2,360	12,380	34,222
June.....	8,614	11,373	1,272	3,392	16,212	40,863
July.....	5,247	11,177	1,164	3,200	20,584	41,372
Totals for 1917-18.....	169,040	135,314	14,008	38,224	84,464	441,050
1918-19						
August.....	3,790	19,496	1,172	3,620	19,004	47,082
September.....	3,341	28,347	900	2,980	6,640	42,402
October.....	8,324	24,531	1,012	2,772	4,504	41,143
November.....	7,023	.....	1,392	3,892	2,672	.....
Totals for 4 months.....	22,678	.....	4,476	13,264	32,820	.....
Totals for 4 months, 1917-18....	71,217	39,018	6,188	17,332	5,296	139,051

Of the total average annual pre-war imports of 894,000,000 bushels (Table I) it has been shown that 636,800,000 were supplied by the present open countries (Table II). Table V shows how far these countries have been able to supply in 1917-18 the same quantities and make up the shortage of 257,000,000 that formerly came from Eastern Europe. The omission here of the lesser exporters: Chili, Tunis, New Zealand and Uruguay, for which data are not available, is unimportant. They only exported a pre-war average of 1,500,000 bushels of

wheat and 11,300,000 of all five cereals. The same countries (Table II) in the pre-war period exported 636,800,000 bushels, against their export in 1917-18 of 734,000,000 (Table V), an increase of 97,000,000 bushels, being so much of a contribution towards making up the 257,000,000 previously supplied by Eastern Europe.

It is of paramount interest to compare with the actual exports shown above the imports actually recorded for the corresponding grain year 1917-18.

TABLE VI.—*Net Imports of Cereals, 1917-18*

(Thousands of Bushels)

Countries	Wheat	Rye	Barley	Oats	Corn	Total for five Cereals
Great Britain and Ireland..	144,649	.....	20,434	45,590	35,018	245,691
France.....	76,170	1,130	7,900	32,590	8,653	126,443
Italy.....	67,450	2,716	5,704	21,216	7,732	104,818
Netherlands.....	702	20	46	156	913	1,837
Switzerland.....	3,597	559	335	2,847	1,114	8,452
Norway.....	3,219	2,027	1,254	.....	953	7,453
Spain.....	2,425	.....	46	.....	118	2,589
Sweden.....	2,025	413	322	.....	571	3,331
Egypt.....	647	.....	14	.....	(a) 94	567
Japan.....	(a) 4,137	.....	23	.....	24	(a) 4,090
Totals.....	296,747	6,865	36,078	102,399	55,002	497,091

(a) Net exports.

TABLE VII.—*World's Production of Cereals*

Wheat

Countries	1918.	1917	Five years' average, 1909-13
	Bushels	Bushels	Bushels
United States.....	919,100,000 (a)	650,828,000	686,694,000
Canada.....	210,316,000 (a)	233,743,000	197,118,000
Mexico.....	8,000,000	8,480,000	8,000,000
Argentina.....	207,000,000 (b)	218,618,000	147,070,000
Uruguay.....	8,000,000	12,860,000	6,518,000
Denmark.....	5,100,000	4,300,000	5,344,000
France.....	228,000,000 (b)	144,151,000	317,639,000
Greece.....	8,000,000	4,000,000	4,320,000
Switzerland.....	7,095,000 (a)	4,556,000	3,314,000
Italy.....	176,372,000 (a)	137,613,000	183,336,000
Netherlands.....	4,500,000	4,586,000	4,896,000
Norway.....	265,000	241,000	306,000
Portugal.....	7,000,000	7,440,000	7,440,000
Cyprus and Malta.....	2,400,000	2,400,000	2,400,000
Spain.....	127,982,000 (a)	142,676,000	130,447,000
Sweden.....	6,900,000	6,871,000	7,769,000
Great Britain.....	86,500,000 (a)	59,750,000	58,043,000
Ireland.....	4,000,000	4,347,000	1,597,000
India.....	380,202,000 (a)	379,232,000	351,766,000
Japan.....	31,127,000 (a)	25,850,000	21,166,000
Algeria.....	35,000,000	28,980,000	34,998,000
Egypt.....	32,555,000 (a)	29,835,000	34,814,000
Tunis.....	9,406,000 (a)	5,963,000	6,230,000
Australia.....	70,000,000 (b)	122,584,000	90,500,000
New Zealand.....	6,000,000	6,276,000	7,070,000
Chili.....	12,000,000	12,000,000	21,246,000
Totals.....	2,592,820,000	2,259,180,000	2,340,041,000

(a) Official figures.

(b) Broomhall's "Corn Trade News."

Figures for other countries for 1918 are estimates based on acreage and condition reports.

The total production of 1918 is 15 p.c. greater than that of 1917 and 11 p.c. greater than the pre-war five-year average.

In table VI it is shown that countries, which, before the war had been importing 894,000,000 bushels of these five cereals, have actually only received 497,000,000 or nearly 400,000,000 less. And, what is strange indeed, the actual receipts were 237 million bushels less than were exported. Although the exports to countries outside of Europe are in normal peace time quite large, comprising 98 million bushels of wheat alone, 237 million cannot in this period be accounted for as such exports.

If the actual imports, as shown in Table VI are any measure of those to follow in 1918-19, the prospects are disappointing for the exporting countries. The supplies of all the five cereals, except corn, are abundant in the exporting countries. Especially is this the case for wheat in Australia, Argentina and the United States. It is now opportune to examine these supplies, taking up first production in the years 1917 and 1918 with a pre-war comparison in the case of each cereal. It is unfortunate that except for wheat, the data for 1918 are not available for all the countries mentioned in the pre-war period, the figures for France being absent. Still the figures for France show a marked decrease for all cereals in 1917 and to a less degree in every year after the outbreak of war.

TABLE VIIa.—*Rye*

Countries	1918	1917	Five years' average 1909-13
	Bushels	Bushels	Bushels
Spain.....	31,853,000	24,203,000	27,600,000
Italy.....	4,724,000	4,334,000	5,500,000
Luxemburg...	4,421,000	292,000	.....
Switzerland...	1,850,000	1,752,000	2,000,000
Canada.....	10,376,000	3,857,000	2,400,000
United States	89,103,000	60,145,000	35,000,000
Totals ...	138,327,000	94,583,000	72,500,000(1)

(1) The total for 1918 shows an increase of 90% over that for 1909-13. The Canadian total is over four times and the United States twice as large.

TABLE VIIb.—*Barley*

Countries	1918	1917	Five years' average 1909-13
	Bushels	Bushels	Bushels
Spain.....	84,464,000	77,957,000	74,400,000
England and Wales.	50,000,000	46,162,000	65,200,000(a)
Scotland..	5,582,000	5,875,000	.....
Italy.....	9,186,000	7,422,000	10,100,000
Luxemburg.	136,000	154,000	.....
Canada.....	83,263,000	55,058,000	42,700,000
Switzerland	666,000	712,000	500,000
United States.	256,375,000	208,975,000	181,900,000
Egypt.....	9,870,000	13,598,000	11,900,000
Japan.....	76,053,000	95,750,000	97,803,000
Tunis.....	9,186,000	8,267,000	7,800,000
Totals	584,781,000	519,930,000	492,300,000

(a) Scotland included.

Here is an increase of nearly 100,000,000 bushels in the totals, in which Canada figures conspicuously having nearly doubled its production.

TABLE VIIc.—*Oats*

Countries	1918	1917	Five years' average 1909-13
	Bushels	Bushels	Bushels
Spain.....	29,113,000	31,116,000	27,200,000
England and Wales ..	124,000,000	99,719,000	194,500,000(a)
Scotland.....	53,223,000	49,984,000	.....
Italy.....	38,907,000	31,345,000	35,000,000
Luxemburg ..	1,373,000	1,897,000	.....
Switzerland ..	4,882,000	4,331,000	4,600,000
Canada.....	456,734,000	403,010,000	326,200,000
United States ..	1,538,359,000	1,587,286,000	1,064,700,000
Tunis.....	3,631,000	3,761,000	3,200,000
Totals.....	2,250,222,000	2,212,449,000	1,655,400,000

(a) Scotland included.

Note the considerable increases in Canada, United States and England and Wales.

TABLE VIId.—*Corn*

Countries	1918	1917	Five years' average 1909-13
	Bushels	Bushels	Bushels
Spain.....	26,584,000	29,369,000	26,400,000
Switzerland.....	358,000	252,000	.....
Canada.....	6,946,000	7,763,000	16,900,000
United States.....	2,532,814,000	3,159,494,000	2,708,100,000
Totals.....	2,566,702,000	3,196,878,000	2,751,400,000

While the 1918 crop is 190 million bushels less than the pre-war average those for

1917-18 taken together exceed that average by 130 million bushels.

Data corresponding to those for cereals are not available for potatoes, but the following table will give an accurate idea of this crop

in a few countries. Note the important increases in England and Wales and Canada, and the falling off of the French crop.

TABLE VIIIc.—Potatoes

Countries	1918	1917	Five years' average 1912-16
	Bushels	Bushels	Bushels
France.....	275,578,000	401,340,000	426,285,000
England and Wales.....	153,000,000	124,693,000	103,018,000
Scotland.....	41,440,000	41,440,000	36,842,000
Luxemburg.....	4,731,000	5,925,000	6,201,000
Canada.....	105,580,000	79,892,000	74,550,000
United States.....	397,676,000	442,336,000	361,753,000
Totals.....	978,005,000	1,095,626,000	1,008,649,000

Rice.

The yield of rice in 1917 in Spain, Italy, United States, India, Japan, and Egypt was 2,264,122,000 bushels, compared with an annual average of 2,838,635,000 during the five years 1911-15. The production of the United States, Italy and Spain in 1918 was 78,053,000 bushels compared with a five years average of 60,363,000 bushels.

Recapitulation of the preceding Tables VII to VIIIc, relating to the production of wheat, rye, barley, oats and corn.

	1918 Thousands of bushels	1917 Thousands of bushels	Average 1909-13 Thousands of bushels
Wheat	2,592,820	2,259,180	2,340,041
Rye	138,327	94,583	72,500
Barley	584,781	2,212,930	492,300
Oats	2,250,222	2,212,449	1,655,400
Corn.....	2,566,702	3,196,878	2,751,400
Totals	8,132,852	8,283,020	7,311,641
Totals less corn	5,566,150	5,086,142	4,560,241

In this recapitulation the data for each one of the cereals does not cover the same number of countries as the others, but only the same years. Therefore the addition of them does not furnish a total of any value except to show for the particular years a tendency to increase in the later over the earlier years. The United States corn crop, which is in effect the world's crop, here swells the figures for 1917 and depresses the figures for 1918. Still the latter show an increase of 10 per cent over the pre-war figures. If corn be removed from the above aggregate totals, the production for 1918 will stand 20 per cent larger than that of the pre-war average and 7½ per cent larger than that of 1917.

When the details of the various tables VII are examined wide differences are found. The notable increases in acreage and production in the United States and Canada will be referred to later; attention is now directed to the aggregate production of wheat, which for 1918 exceeded the pre-war

average by 11 per cent. Argentina's corresponding increase for wheat is 40 per cent, Great Britain's increase for wheat is also 40 per cent, and for oats 37, per cent.

Here is presented, in comparison with the pre-war period, a bird's eye view of the acreage and production in 1917—when data were available for a larger number of countries for each cereal than in 1918—percentages only being given.

Products	Acreage of 1917 compared with five year average 1909-13	Production of 1917 compared with five year average 1909-13	Number of countries on which estimates are based.
	%	%	
Rye	103.4	89.2	12
Barley	104.2	100.3	18
Oats	113.0	123.5	17
Corn	114.5	115.1	7

The decreases are altogether in European countries, the American Continent and Australasia recording increases in all cereals. France and Italy were the worst sufferers, as the following statement shows:

Products	France		Italy	
	Thousands of bushels		Thousands of bushels	
	1917	Average 1909-13	1917	Average 1909-13
Wheat.....	144,151	317,639	137,613	183,336
Rye.....	27,509	49,025	4,460	5,330
Oats	223,461	334,383	31,896	34,775
Barley.....	39,557	48,185	7,422	10,105
Potatoes.....	401,340	484,965	55,116	60,807
Totals.....	836,018	1,234,197	236,507	294,353

Thus France's production was 47½ per cent, and Italy's 20 per cent less than pre-war

production. For 1918, the only data available relate to wheat, and show Italy's yield to be only slightly under normal, and France's to be 60 per cent of pre-war, against over 100 per cent as it stood in 1917.

This result of the war upon production especially in France, seems to offer a plausible basis for the formation of an estimate of the

crops of the central empires, which have not reported to the Institute since 1914. Apply to these countries a somewhat less reduction, say 40 per cent and there can be formed from the following table some idea of the central empire requirements, including those of Belgium which probably fared worse.

TABLE VIII

	Average Production. 1909-13	Average imports. 1909-10 to 1913-14	Average Consumption 1909-10 to 1913-14	Estimated Production 1918	Estimated import requirements 1918-19
		Thousands	of Bushels.		
WHEAT—					
Germany.....	152,859	68,343	221,197	91,859	129,338
Austria-Hungary ..	230,750	10,288	241,039	138,450	102,588
Belgium.....	14,896	49,200	64,096	8,938	55,158
Totals	398,505	127,831	526,332	239,247	287,084
RYE—					
Germany.....	445,225	(a) 26,400	418,825	267,135	151,690
Austria-Hungary ..	161,876	(a) 1,200	160,676	97,136	63,540
Belgium.....	22,675	4,700	27,375	13,605	13,770
Totals	629,776	(a) 22,900	606,876	377,876	229,000
BARLEY—					
Germany.....	153,531	149,300	302,831	92,119	210,712
Austria-Hungary ..	147,660	(a) 7,400	140,260	88,596	51,664
Belgium.....	4,247	15,100	19,347	2,548	16,799
Totals	305,438	157,000	462,438	183,263	279,175
OATS—					
Germany.....	557,600	3,200	560,800	334,305	226,495
Belgium.....	38,900	7,800	46,700	21,213	25,487
Austria-Hungary...	239,900	1,900	241,800	143,441	98,359
Totals	836,400	12,900	849,300	498,959	350,341
CORN—					
Germany.....		31,900	31,900		31,900
Belgium.....	27,600	17,300	44,900	16,560	28,340
Austria-Hungary...	208,700	15,000	223,700	125,420	98,280
Totals.....	236,300	64,200	300,500	141,980	158,520
RECAPITULATION—					
Wheat.....	398,505	127,831	526,332	239,247	287,084
Rye.....	629,776	(a) 22,900	606,876	377,876	229,000
Barley.....	305,438	157,000	462,438	183,263	279,175
Oats.....	836,400	12,900	849,300	498,959	350,341
Corn.....	236,300	64,200	300,500	141,980	158,520
Grand totals.....	2,406,419	339,031	2,745,446	1,441,325	1,304,120

(a) Net exports.

We have not considered root crops which in France suffered a greater loss than the cereals; and which for the same reasons: lack of labour, fertilizers, and motor fuels, must have suffered even more in the enemy countries. Germany alone produced a pre-war average of no less than 1,682,000,000 bushels of potatoes. Oats have no doubt been used less for horses and more for other live stock and human food, being to some extent replaced, as in the more Western countries, by dried brewers' grains, rice meal, etc. Taking the five cereals together, assuming the consumption of the people to have reverted to the pre-war normal, there would

need to be an import of no less than 1,304,120,000 bushels of the five cereals, against a pre-war-average import of 339,000,000 bushels.

Whether the assumed 40 per cent reduction is too great or not, it should be recalled that just now, only three months after the completion of their harvest, bitter complaints of starvation conditions are heard from our enemies. No doubt the animal shortage is more serious than the cereal, and this is also an important factor in the situation. From the meagre reports that have been received the situation is little if any better in the Balkan nations, including Roumania. So

any exports of cereals that might be spared from the Ukraine and other parts of Russia, would scarcely cover more than the urgent needs of contiguous territories.

In 1918-19 it devolves once more on this continent, Australasia and India to supply the great demand. India has such poor prospects for the next harvest in April, that apart from a modest contribution from this year's crop, she will not be an important factor. Australasia and Argentina will de-

pend on improved shipping facilities to get their superabundant supplies to market. The fact to be watched is whether the comparatively low prices will not attract the ships. It therefore behooves the producers of cereals in North America to make a careful survey, not only of European requirements, but of their own sources of supply. Hence the synoptic review here presented of acreage and production in Canada and the United States.

TABLE IX.—*Acreage of Crops in Canada.*

Crop.	1918	1917	1916	1914	Five years' average 1910-14	1918 compared with five years' average
						%
Wheat.....	17,354,000	14,756,000	15,370,000	10,294,000	10,454,000	166.0
Oats.....	14,790,000	13,313,000	10,996,000	10,062,000	9,749,000	151.7
Barley.....	3,154,000	2,392,000	1,803,000	1,496,000	1,500,000	210.3
Rye.....	555,000	212,000	148,000	111,000	121,000	458.7
Buckwheat.....	548,000	396,000	342,000	354,000	373,000	146.7
Corn for husking.....	250,000	234,000	173,000	256,000	290,000	86.2
Total Cereals.....	36,651,000	31,303,000	28,832,000	22,573,000	22,487,000	163.0
Potatoes.....	735,000	657,000	473,000	476,000	476,000	154.4
Hay.....	10,545,000	8,225,000	7,821,000	7,997,000	8,268,000	127.5
Corn for fodder.....	515,000	366,000	293,000	317,000	302,000	170.5

TABLE IXa.—*Production of Crops in Canada.*

Crop.	1918	1917	1916	1914	Five years' average, 1910-14	1918 compared with five years' average
	Bushels	Bushels	Bushels	Bushels	Bushels	%
Wheat.....	210,315,000	233,743,000	262,781,000	161,280,000	196,026,000	107.3
Oats.....	456,734,000	403,010,000	410,211,000	313,078,000	343,612,000	132.9
Barley.....	83,263,000	55,058,000	42,770,000	36,201,000	41,436,000	200.9
Rye.....	10,376,000	3,857,000	2,876,000	2,017,000	2,155,000	481.5
Buckwheat.....	11,470,000	7,149,000	5,976,000	8,626,000	8,631,000	132.9
Corn for husking.....	6,946,000	7,763,000	6,282,000	13,924,000	16,231,000	42.8
Total cereals.....	779,104,000	710,580,000	730,896,000	535,126,000	608,091,000	128.1
Potatoes.....	105,580,000	79,892,000	63,297,000	85,672,000	75,190,000	128.1
Corn for Fodder.....	.....	2,690,000	1,908,000	3,251,000	2,856,000	.....
Hay.....	.....	Tons	Tons	Tons	Tons	.....
	.....	13,685,000	14,527,000	10,259,000	11,706,000	.....

TABLE X.—*Acreage of Crops in United States.*

Crop	1918	1917	1916	1914	Five years' average 1910-14	1918 compared with five years' average
						%
Corn ..	113,835,000	119,755,000	105,296,000	103,435,000	105,240,000	108.2
Wheat.....	64,659,000	59,045,000	56,810,000	54,661,000	52,452,000	123.3
Oats.....	44,475,000	43,572,000	41,527,000	38,442,000	38,014,000	117.0
Barley.....	9,108,000	8,835,000	7,757,000	7,565,000	7,593,000	120.0
Rye.....	6,119,000	4,480,000	3,474,000	2,733,000	2,562,000	238.8
Buckwheat.....	1,945,000	1,006,000	828,000	792,000	826,000	126.5
Total Cereals.....	239,241,000	236,693,000	215,692,000	207,628,000	206,687,000	115.7
Potatoes.....	4,113,000	4,390,000	3,565,000	3,711,000	3,686,000	111.6
Hay.....	53,386,000	53,516,000	55,721,000	49,145,000	49,357,000	108.2

TABLE Xb.—*Production of crops in the United States.*

Crops	1918	1917	1916	1914	Five years' average 1910-14	1918 compared with five years average
	Bushels	Bushels ;	Bushels	Bushels	Bushels	%
Corn...	2,532,814,000	3,159,494,000	2,566,927,000	2,672,804,000	2,732,457,000	92.7
Wheat	919,100,000	650,828,000	636,318,000	891,017,000	728,225,000	125.9
Oats	1,538,359,000	1,587,286,000	1,251,837,000	1,141,060,000	1,157,961,000	132.9
Barley...	256,375,000	208,975,000	182,309,000	194,953,000	186,208,000	137.7
Rye.....	89,103,000	60,145,000	48,862,000	42,779,000	37,568,000	237.0
Buckwheat.....	17,182,000	17,460,000	11,662,000	16,881,000	17,022,000	100.9
Total Cereals ..	5,352,933,000	5,684,188,000	4,697,915,000	4,959,494,000	4,859,441,000	110.1
Potatoes...	397,676,000	442,536,000	286,953,000	409,921,000	360,772,000	101.2
Hay	Tons 71,555,000	Tons 79,528,000	Tons 91,192,000	Tons 70,071,000	Tons 66,234,000	108.0

The United States Winter Cereals 1918-19.

The largest winter wheat crop ever grown in the history of the United States is promised by the enormous acreage sown this fall. The acreage is almost 16 per cent larger than last year's and totals 49,027,000 acres. A total crop of 765,000,000 bushels is forecasted, or 80,000,000 bushels more than the record crop of 1914, which amounted to 684,998,000 bushels. Last year's crop was 558,449,000 bushels.

The condition of the crop on December 1st was 98.5 per cent of a normal, compared with 79.3 a year ago, 85.71 in 1916, and a ten-year average of 88.2.

The area sown to rye is 6,820,000 acres which is 1.7 per cent more than the revised estimated area sown in the fall of 1917, which was 6,708,000 acres.

The condition of the rye crop on December 1st was 89.0 per cent of a normal, compared with 84.1 a year ago, 88.8 in 1916, and a ten-year average of 91.4.

Wheat Supply and Demand, August 1st, 1918 to August 1st, 1919.

The good wheat crops in Great Britain and Italy and comparatively good ones in France, have somewhat relieved the urgent demand in Europe. That demand is much more urgent in the neutral and enemy countries and is difficult to estimate. The following estimates are based on the average pre-war consumption. The estimated importing requirements added to this year's crop for each country furnish the total estimated consump-

Countries	Estimated Requirements	Total supply for 1918-19	Pre-War average consumption
	Bushels	Bushels	Bushels
France.....	90,000	317,639	317,639
Great Britain....	180,000	267,200	275,578
Italy.....	50,000	226,000	236,000
Greece and Serbia	25,000	.....	.....
Spain and Portugal ..	6,000	136,000	146,000
Belgium.....	50,000	159,000	164,000
Scandinavia and other European neutrals ..	50,000	73,000	78,000
Germany.....	80,000	161,859	221,197
Austria Hungary ..	20,000	158,450	241,039
Egypt, Palestine and Mesopotamia.....	20,000	.....	.....
Outside Europe.....	80,000	277,000	357,000

World's Requirements: 651,000

tion for the current year, shown in the second column.

Making a fair allowance for stocks which will be left over on August 1st next, an estimated statement is here presented of the supplies of wheat available for export, and of the shipments which might be made within the year, shipping facilities permitting. The carry-over from the grain year 1917-18 has been added to the current crop and 5 per cent has been deducted from the United States crop for screenings and waste wheat which cannot be marketed. 10 per cent has been deducted from the Canadian crop because the low grading of the crop so far reported would indicate that a large allowance should be made for unmerchantable wheat.

Countries	Net Mer- chant- able stocks August 1, 1918	Food and Seed	Carry- over August 1st 1919	Pro- bable Export
	Thou- sands of Bushels	Thou- sands of Bushels	Thou- sands of Bushels	Thou- sands of Bushels
Canada.....	197,000	77,000	5,000	115,000
United States..	898,000	600,000	23,000	275,000
Argentina.....	261,000	70,000	61,000	130,000
Australia.....	200,000	40,000	50,000	110,000
India.....	380,000	320,000	40,000	20,000
Totals.....	1,936,000	1,107,000	179,000	650,000

See table V.

It would only be through Governments favouring export and import to the utmost limit that 650 million bushels could be exported by August 1st next. Price concessions by Australia and Argentina might abnormally stimulate shipments from these countries.

As to the prospects of shipping facilities, Mr. Geo. Broomhall makes the following interesting statement in the Corn Trade News of December 10th inst.

We may well rest assured that as regards actual supplies of wheat, there is no lack, even supposing that Germany and Austria be granted a share of what there is to spare, but what of ocean-carriers to bring the bread-stuffs and feeding grain? The latest official statement on the tonnage situation is very reassuring on this point, and clearly indicates that before the year 1919 is very far advanced, the World's merchant fleet will be as large as it was previous to the war. We do not think that a mercantile fleet on a pre-war basis will mean an abundant supply of tonnage for all needs, because a number of ships may still be wanted for military purposes, whilst importers may need abnormally large supplies of food and raw materials, of which a larger proportion than usual will have to be brought from distant lands, owing to lack of Russian and Roumanian supplies, but, anyway, the general position will have vastly improved, and it will continue to grow steadily better.

Taking a longer view of the shipping situation, we may pause a moment to consider what will be the position when the World's shipbuilders have actually put afloat sufficient tonnage to make good all the war-time losses. As already said, this will happen early next year, but when the losses are made good the output of 600,000 tons per month will, as far as one can see at present, continue to be maintained. It follows as a matter of course that with this rate of construction the total mercantile fleet of the world will very soon become enormous. When this happens, are we to expect that freights will fall to a level as low as they have ever been?—and we may remind our readers that at one time the rate for grain to Liverpool from New York was less

than $\frac{1}{2}$ d. per bushel. Will there be an international agreement to limit construction? And, if so, how will it be enforced? Will the chief coal-producing nations, namely the United Kingdom and the United States, be able to come to an agreement, and, having done so, will they be able to induce the smaller countries to conform to the regulations which they have established? Many of these smaller nations own no coal at all, so they will probably be amenable to direction from the big coal owners. But will this not be an interference with the freedom which it is desired to assure to all small nations? The position, as we view it, is certainly fraught with great difficulties and great possibilities—the difficulty of stopping work in a number of big shipbuilding yards, and thereby throwing thousands of men out of employment is not one to be lightly regarded; on the other hand, the possibility of cheap freights is an alluring one, especially for countries situated as we are. We may give as an instance, the facilities that cheap freights would give to us for obtaining cheap maize from Argentina. There is a large stock of old corn in that country, and the present good prospects for the new crop make it probable that in 1919 there will be some 215,000,000 bushels of this cereal on hand and available for shipment, and supposing that really low freights could be obtained, there is the possibility that this maize could be brought to our country and sold here at 72 cents per bushel or less, and other staple articles in proportion, we say nothing of wheat, for the Governmental guarantees of minimum prices in this country and in the States remove that cereal, for a long time to come, outside the sphere and operation of natural economic laws.

Ocean Freight Rates.

What has been the course of ocean freight rates, to which Mr. Broomhall has just alluded? The following statement furnishes the reply. It appears that North America is no longer favoured by the wide difference in rates as between North Atlantic and Argentine ports.

CENTS PER BUSHEL.

Date	New York to Liver- pool	India to Liver- pool	Argen- tina to Liver- pool	Austra- lia to Liver- pool
Average of 5 year's ending				
1913	4.8	10.9	8.6	(a) 17.0
July 1914.....	5.3	7.9	6.9	(a) 12.2
Jan. 1915.....	20.5	21.3	40.8	.....
Jan. 1916.....	40.6	68.4	91.2	(a) 48.9
Jan. 1917.....	29	88	83	79
Jan. 1918.....	32	1.63	1.30	85
July 1918.....	32	1.63	1.34	71
Dec. 1918.....	36	49	41	65 to 80

(a) sailing ships.

Concluding Observations.

From the review of the situation made in the present article, some misgivings may be entertained as to the maintenance of the present high prices of cereals. Circumstances may compel somewhat lower prices from one to three years hence; but the movement of the prices of wheat after all the great wars, from and including the Napoleonic wars to recent times, justifies the expectation that prices will continue relatively high for a long time to come. This question has been fully discussed by the writer in an article published in the "Bulletin of Foreign Agricultural Intelligence" of February 1916 (p. 163 et seq.); and also in an article entitled "Wheat Prospects after the War," published in the "Agricultural Gazette" of July 1917 (pp. 638-641).

Without detracting from the interest which Canadian farmers have in growing cereal crops, there appears justification for now inviting the attention, if but briefly, to the live stock situation, as connected with their cereal interests, in order to show that, whatever quantities of cereals they may produce they may market to the greatest advantage in the form of a more highly finished and profitable product. The live stock shortage of Europe at the present moment must be largely replenished from this continent, but there is an even more alluring prospect in the growing U.S. demand which can no longer be supplied by domestic stock. From the following synoptic statement of the numbers of live stock on this continent with reference to population, it appears that the United States will, in the near future, be more and more dependent on Canadian production.

TABLE XI.—Population Compared with Numbers of Live Stock

UNITED STATES—(000 omitted).

	1900	1905	1910	1914	1915	1916	1917	1918
Population	76,000	84,084	92,174	98,646	100,264	101,882	103,500	104,309
Cattle	67,720	61,241	63,683	66,592	58,329	61,920	64,583	66,830
Swine	37,079	47,320	59,474	58,933	64,618	67,766	67,503	71,374
Sheep	41,883	45,170	52,839	49,719	49,956	48,625	47,616	48,900

In 1918 the population of the United States was 37.2 per cent greater than in 1900. Between the same years the number

of cattle decreased by 1.3 per cent, swine increased 92.5 per cent and sheep increased 16.7 per cent.

CANADA—(000 omitted)

	1901	1911	1914	1915	1916	1917	1918
Population	5,371	7,206	...	8,075	8,136	...	...
Cattle	5,576	6,586	6,037	6,066	6,594	7,920	10,051
Swine	2,354	3,634	3,434	3,112	3,474	3,619	4,290
Sheep	2,510	2,174	2,058	2,039	2,023	2,369	3,053

In 1916 the population of Canada was 51.5 per cent greater than in 1901. Between 1901 and 1918 the number of cattle increased by 80.3 per cent, swine 82.2 per cent, and sheep by 21.6 per cent.

It appears from the statistical tables presented herein that the production in Canada of the coarser cereals has progressed more rapidly than the production of wheat. This is remarkable in view of the fact that the Government has fixed a price for wheat for the purpose of stimulating its production. Oats, for instance, which, from the earlier Canadian censuses, seems to have been used almost exclusively for horse feed has in recent years been extensively fed to live stock and with other coarse cereals to a great extent

fills the place in Canada so conspicuously filled by the corn crop in the United States. This shows that the Canadian farmer realizes the considerable profit resulting from feeding these cereals. Nor need they be anxious this season about their unmerchantable wheat. There is in the Weekly News Letter of the United States Department of Agriculture, February 17, 1915, the following statement with reference to the feeding of wheat to swine:

"Chief among the small grains is wheat, and it appears to be the food best adapted for long-continued hog feeding. . . . A bushel of wheat properly fed to reasonably well-bred hogs should produce approximately 13 pounds of gain in weight. The

results of a number of feeding tests show that there is comparatively little difference in feeding value between wheat and corn for swine. In comparing various rations in which corn, wheat and rye were fed alone or in combination with each other, it was found that dry, ground wheat gave the greatest returns and required the least amount of grain to make 100 pounds of gain. Wheat should be ground and mixed with some supplement, such as tankage, peas, or soy-bean meal. The results

obtained from a number of tests have proved this to be a good practice."

This American view has been confirmed by an expert of the Live Stock Branch of our own Department of Agriculture. It is interesting in conclusion to note that at the rate of 13 lbs. of gain in weight per bushel of wheat fed to hogs with the price of hogs at \$17 per cwt. the price yield per bushel of wheat fed would be \$2.21, which is actually the Government price for No. 1 Northern Wheat delivered at Fort William.

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DEPARTMENT OF AGRICULTURE

The Agricultural Gazette of Canada

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THE LIVE STOCK INDUSTRY.

EVERY bit of new information that reaches Canada respecting the shortage of live stock in European countries, justifies the utmost effort on the part of governments and individuals to prepare for a continuously keen demand for the products of our herds and flocks.

In the December number of THE AGRICULTURAL GAZETTE the Honourable Mr. Crerar issued an appeal for a maintenance of breeding operations on a war-time scale and an improvement in the herds and flocks of the country. In the January number, the chairman of the Canada Food Board presented the situation from a world standpoint. In that issue also the policy of the federal Live Stock Branch to foster the industry, was fully set forth. While the need is pressing equally upon those responsible in the different provinces, the specific handling of the situation differs according to local conditions and the judgment of the responsible heads.

In order that the policies in the different provinces may be studied side by side, and linked up each with each, as far as practicable, also with the federal Department, there are brought together in this number statements of responsible officials in most of the provinces setting forth their programmes in operation or under contemplation.

As was shown in the article describing the work of the Live Stock Branch, much is being done to improve the supply and attract the markets. And now almost immediately a further step is to be taken to insure confidence in the marketing machinery and the markets themselves by the administration of regulations provided for by the Live Stock and the Live Stock Products Act of 1917, by which stockyards and live stock exchanges will be regulated. In the handling of this work and other problems that will arise, the Live Stock Commissioner will have the assistance of the recently organized advisory committee representing producers, transportation companies, financial institutions, and meat packers, all of whom are deeply concerned with the success of the live stock industry which is recognized as an important factor in the prosperity of the country.

These services, with the development of co-operative marketing at the one end, and the establishing of agencies in foreign countries to look after the interests of Canadian meat products, at the other, should not only secure the producer the full value of his live stock, but establish such confidence in the just disposal of his product as will leave his mind, like that of the Danish hog raiser, free to look after only the production end of the industry.

PART I

Dominion Department of Agriculture

THE EXPERIMENTAL FARMS

THE DIVISION OF HORTICULTURE

WINDBREAKS FOR ORCHARDS

BY W. T. MACOUN, DOMINION HORTICULTURIST

THE object of a windbreak is, as the word indicates, to break the force of the wind; and the object of breaking the force of the wind is to protect the trees from the injurious effects of exposure to the full force of it. The protection of the windbreak prevents the trees from becoming loosened or blown about by it, and thus having their growth checked. A windbreak also prevents trees from becoming unshapely as they often do when exposed to the wind. It protects the trees from cold winds which would check the development of the trees during the growing season. Windbreaks prevent fruit from being blown off the trees, and in the prairie provinces in particular they help to prevent winter killing, and the drying out of the soil by hot dry winds in summer.

At the Experimental Station at Charlottetown, P.E.I., Nappan, N.S., Ste. Anne de la Pocatiere, P.Q., and Cap Rouge, P.Q., it has been found necessary to plant windbreaks to protect the orchards which at all of these places are situated where they have little natural protection, and where frequently the winds are high and cold.

Windbreaks are necessary on the prairies to lessen the drying effects of the wind both in winter and summer. It has been found that trees suffer less from winter there,

where they are protected by a windbreak.

In the Provinces of Ontario and British Columbia, and in parts of the Maritime provinces, where fruits are grown in valleys and on slopes where there is good natural protection, or where they are grown where high winds are not prevalent, windbreaks are not so necessary; and in fact in many cases it may be better to have no windbreak, as the windbreak lessens the circulation of air, and injurious insects are liable to multiply much more rapidly.

A good circulation of air is necessary, also, in combatting fungous diseases, as it is important to have leaves and fruit dry off as soon as possible after dew or rain; hence anything like a windbreak, or unpruned trees, which lessens circulation, may do more harm than good,

In Eastern Canada the White and Red spruces make good trees for windbreaks, though the Norway spruce will in most places grow somewhat faster, and is a good tree for this purpose. A single row of these, planted from eight to ten feet apart is quite sufficient under most conditions. The windbreak should be at least fifty feet away from the first row of fruit trees in Eastern Canada. The Norway spruce will grow, if properly cared for, at the rate of from two to three feet a year until it reaches a height of fifty to sixty

feet or more. In very exposed places it is desirable to plant two rows of trees, the trees forming the second row being planted from eight to ten feet behind the trees in the first row. The first row may be composed of American Arbor-Vitæ, which is rather slow growing, and the row behind made of Norway spruce or native spruce, if desired. White pine and European larch are also rapid growing trees which are useful for windbreaks in Eastern Canada. Scotch pine is inclined to be irregular in growth, and is on this account sometimes not satisfactory. Other trees, both native and exotic, will also give good satisfaction. Lombardy poplar planted about eight feet apart makes a windbreak in a short time, as it is a very fast growing tree.

While windbreaks are useful in Eastern Canada, they are absolutely necessary on the prairies where there is no natural protection. A windbreak on the south and west sides of an orchard or small fruit plantation to check the hot winds is of as much or greater importance on the prairies than one on the north and east sides to check the cold winds, hence it is desirable to enclose a plantation with a windbreak.

Fruit trees growing close to the south or west sides of windbreaks may be more injured than benefitted by the windbreak, as in late winter or early spring the sun shining on the south or west side of a windbreak raises the temperature about the fruit trees much higher than if the windbreak were not there. The fruit trees thaw out every day, frosts are severe night after night, and these extremes cause severe injury or death to the trees. Whereas, when fruit trees are on the north or east side of a windbreak, this kind of injury is not so likely to occur, and they get the protection of the other windbreak from the cold winter winds.

Some of the most useful trees for windbreaks on the prairies are the Manitoba maple or Box Elder (*Acer negundo*), the laurel-leaved willow (*Salix pentandra*), the native white spruce (*Picea canadensis*), and the Siberian pea tree (*Caragana arborescens*).

In planting trees for windbreaks on the prairies, four feet apart in the row is a good distance for all of the above except the Siberian pea tree, which should be planted about eighteen inches apart.

ADVISORY COMMITTEE FOR THE LIVE STOCK TRADE.

The importance of the Canadian live stock industry and its dependence upon a proper development of the export trade in animal products have led to the organization of an advisory committee representing producers, manufacturers, transportation companies, and bankers, to consider with the Live Stock Commissioner the problems arising in connection with the domestic and export trade. The committee consists of Mr. Robert Miller, Stouffville, Ontario, representing the National Live Stock Council; Mr. W. M. Neal, Montreal, secretary of the Canadian Railway War Board, representing Canadian railways; Mr. D. A. Cameron, manager of the Canadian Bank of Commerce, Toronto, representing the Canadian Bankers' Association, and Mr. W. E. Matthews, of the Matthews-Blackwell Company, Ottawa, representing the meat packers.

This committee meets as occasion demands and after action is decided upon each member works in direct connection with the interest he represents in the effort to find the solution required. The question of better transportation is receiving first consideration with a view of securing improved service for the central live stock markets of Canada. Mr. Neal will prepare for the consideration of the whole committee a report on the situation.

DIVISION OF BEES

TRIAL OF A SYSTEM OF KEEPING TWO QUEENS IN A HIVE

BY F. W. L. SLADEN, APIARIST, DOMINION EXPERIMENTAL FARM

THE bees at the Central Experimental Farm, Ottawa, have produced an average of 121 pounds of honey per colony, spring count, during the six years 1913 to 1918, showing beekeeping to be a very profitable undertaking here when carried on by those who understand it and give the bees the right attention when they need it. The figures from the Experimental Farms at Nappan, N.S., and Lethbridge, Alta. are also high, and had these apiaries been under continuous expert care like the one at Ottawa, they would probably have produced about the same returns.



WIRE SCREEN AND PORTICO

The high yield at Ottawa was due, primarily, to the large number of warm and fine days and good average rainfall in spring and summer, the good soil in the neighbourhood and the continuous covering of snow in winter. It was due, directly in the main to the fact that these conditions are very favourable for the growth, nectar secretion and survival from year to year of alsike and white clover, the principal sources of the

honey, and also to the remarkably long and favourable period for breeding bees from the time the snow disappears in mid-April until the honey flow from these clovers begins at the end of June.

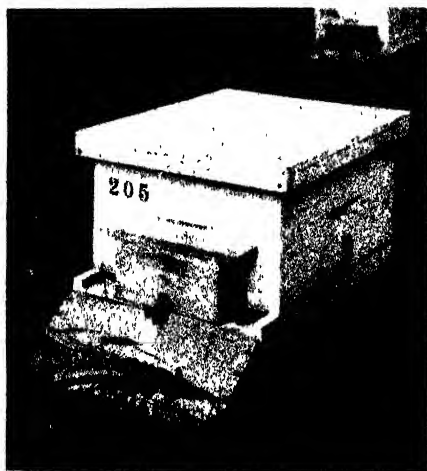
A careful study of the conditions at Ottawa shows that the ordinary methods of beekeeping do not make full use of this breeding period, and that a still higher yield could be obtained were means to be devised that would do this and that would reduce a heavy loss of bees that takes place in the winter.

In regard to loss in winter, very few colonies died outright during the winter but many lost about half of their bees. An important cause of this loss was ascertained to be stores that were more or less unwholesome and granulated. In some years the loss was high, in others only moderate, and individual colonies varied much. The experiments showed that the clover honey was more wholesome for wintering than honey gathered later in the season. A certain amount of loss in winter was also due to an insufficient number of young bees raised during August.

In regard to the breeding period in spring, colonies that passed the winter with comparatively little loss became strong enough to swarm during the honey flow from dandelion at the end of May. This swarming interrupted the breeding of bees. Although it could usually be prevented by destroying all queen-cells every week, the time soon came when the queen reached the limit of fecundity, and before long the amount of brood raised every day ceased to increase.

Another, and in some ways the greatest problem at Ottawa has been the control of swarming. This has become a problem of labour to a

great extent. After the first rush of swarming during the dandelion flow, there is a check during a honey dearth, more or less, that occurs in June, after which swarming reaches its greatest intensity during the honey flow from clover in July. The swarming season lasts altogether for about nine weeks, from about the end of May until the beginning of August. No single manipulation such as giving more room for the queen to lay, or raising brood to the super, will prevent swarming at Ottawa, but it has been prevented by destroying all the queen-cells every week for about nine weeks. This is a great labour and not always effective. Indeed



HIVE WITH PORTICO FITTED

the principal labour in the apiary has been preventing swarming by lifting heavy supers of honey off the hives and searching for and destroying all queen-cells every week. If swarming is permitted, not only is the honey crop reduced because the forces of the bees are divided, but the apiary has to be constantly watched to prevent the escape of swarms, a considerable disadvantage when the beekeeper has out-apiaries to attend to. There is, therefore, a great need for a sure method of preventing swarming without much labour.

The writer has attempted to meet these different requirements with a

system of keeping two queens in each hive during eleven months of the year. This system has been tried on a small scale during the season of 1918. The trial has shown the system to be workable and preparations have been made for a more extensive test in 1919, not only at the Experimental Farm, but in the open country, some distance from the city.

Two young queens separated by a double wire-cloth screen were wintered in one hive in the cellar in 1917-18. During the honey flow from dandelion, the bees and queen on one side of the screen were transferred to a separate hive; thus the desire to swarm at this time was not allowed to develop, and there was an uninterrupted and steadily increasing production of young bees from the two queens, with the result that two strong colonies were obtained in time for the opening of the honey flow from clover, the number of bees produced much exceeding the number that was obtained in hives that began the season with only one queen, 480 pounds of honey were produced by these bees.

In order to prevent swarming during the clover honey flow and to again get two young queens in each hive (all the following stages were carried out in several colonies) the old queen was removed from the brood chamber at the commencement of this honey flow and eight days later all queen-cells were destroyed except two, one on each side of the wire-cloth division then inserted. A special portico fixed in front of the hives separated the entrance of each half of the hive from that of the other by about nine inches, to prevent the queens that emerged from the cells from meeting after returning from their mating flights. No swarming took place.

The two prolific young queens thus obtained caused the production of more brood in August than in an ordinary colony containing only one queen, so that more young bees were raised for wintering. There was also

less honey stored in the brood chamber, and as soon as the supers were removed at the end of the honey flow in September, the bees were supplied with a wholesome feed for winter consisting of a mixture of sugar syrup and clover honey which they stored in the combs previously occupied by the brood. A colony on this mixture had wintered well the

during the June honey dearth, and also for insulating the hives in spring and autumn.

By this system the number of colonies is doubled every year. Modifications of the system to give a greater increase and no increase at all were worked out.

The annual requeening in this system ensures against the loss that

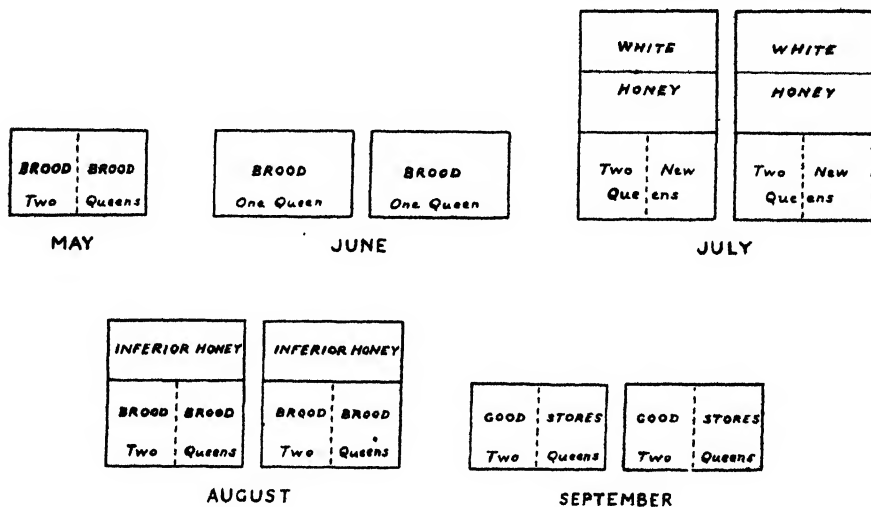


DIAGRAM ILLUSTRATING THE DOUBLE QUEEN SYSTEM IN BEEKEEPING

previous year. The colonies were placed in the cellar for winter.

Provision was made for supplying a selected queen and brood at the time when the white honey was removed in early August to any hive that had lost its queen. Provision was also made for feeding the bees slowly to maintain rapid breeding

occurs in many apiaries due to old and worn-out queens; it is also the correct treatment for European foulbrood, the most destructive disease of bees in the Ottawa Valley. In the experiments, queen-cells containing Italians of selected parentage were substituted for those raised in the colony, except in a few cases.

THE ENTOMOLOGICAL BRANCH

THE ROSE MIDGE IN ONTARIO

BY WM. A. ROSS, DOMINION ENTOMOLOGICAL LABORATORY, VINELAND STATION, ONT.

THE purpose of this article is to direct the attention of florists to a serious insect enemy of roses, viz.: the Rose Midge, which has but recently become established in Ontario. The midge, introduced undoubtedly from the United States, where it has been recognized as a rose pest since 1886, was first discovered in 1914 in Mr. S. F. Wood's large rose garden near London. Two

the rose grower has to contend. In two Chicago greenhouses referred to in the 27th Report of the State Entomologist of Illinois, the annual loss due to the depredations of the midge was \$10,000.

NATURE OF INJURY

When very abundant, the larvæ of the midge—whitish maggots—may be found feeding on any succulent part of the rose bush, as for instance, at the base of the flower buds, within the buds, on the upper side of tender leaves, and on leaf petioles. However, the favorite and usual point of attack is on the young shoot in the axil of a leaf petiole. Infested shoots grow crooked and, as a general rule, wither and die. Affected flower buds when not killed outright may be so disfigured as to be unsaleable.

Fortunately for the florist, the midge remains quiescent in the soil during the winter, when the most profitable crops are grown. Nevertheless, as a Toronto rose grower suggests, the winter crops must suffer as a result of the check the infested plants receive in the summer and fall.

VARIETIES ATTACKED

In Mr. Wood's garden at London all Hybrid Teas and Hybrid Perpetuals are subject to attack, Mrs. John Laing apparently being the most susceptible. H. P.'s with strong terminal shoots like those of Killarney are practically immune. All the Polyantha, Bourbons, Hybrid China, Noisette, and Wichuraiana roses appear to be immune. In the Toronto and Port Dover greenhouses Ophelia and Milady roses are by far the most susceptible varieties; Russell, Stanley, Richmond, Shawyer,



ROSE BUD IN CENTER DESTROYED BY
THE ROSE MIDGE

years later it appeared in a Toronto greenhouse and this year it was found injuring greenhouse roses at Port Dover.

The experience of florists in the United States indicates that this insect, when present, is undoubtedly the most destructive pest with which

Hoosier, Beauty, Columbia, Sunburst, are attacked to some extent, and here again Killarney appears to be partly immune.

LIFE HISTORY

The adult insect is a fragile, two-winged fly, less than one-sixteenth of an inch in length. The female deposits her eggs between the folded leaves of the leaf buds, and to some extent in the axils of tender leaves and between the sepals and petals of the blossom buds. Under greenhouse conditions the eggs hatch in about two days. The maggots, as previously stated, feed on the tender tissues of shoots and buds and become mature in from five to seven days. They then drop to the soil, change to the pupal stage, and emerge as adult flies in about six days.

The midge is most abundant and destructive during summer. With the coming of autumn it declines in numbers, and by November wholly disappears from the rose plants. It remains dormant in the soil throughout the cold winter months and does not reappear again until early March.

CONTROL

Nicotine Fumigation and Tobacco Dust Treatment.—Mr. E. R. Sasser, of the United States Department of Agriculture, informs me that in an experiment conducted by his department in co-operation with the Maryland Experimental Station, the Rose Midge was wholly eradicated in a Baltimore greenhouse by the following method: "Tobacco dust was sprinkled over the beds from $\frac{1}{4}$ -inch to $\frac{1}{2}$ -inch thick to prevent the falling larvæ from entering the soil, and this was followed by nightly fumigations with tobacco paper. These fumigations were conducted as long as adults were seen. As an additional precaution, all the walks were sprayed with a 5 per cent kerosene emulsion to

kill any larvæ which might have fallen from the plants to the walks."

Tobacco Fumigation and Destruction of Infested Buds.—The experience of a Toronto grower indicates that the midge may be held in check by the following measures: As soon as the midge is observed in the spring fumigate every night with nicotine for three or four weeks. Repeat this treatment any time the midge threatens to be troublesome. Pinch off and destroy infected shoots and buds as soon as they are noticed.

Drying off.—Although this method has not been tested, it seems certain that the Rose Midge could be exterminated in a greenhouse by drying off all the rose plants at the same time during the summer. As there would be no tender shoots on the plants for at least four weeks, the midge would die of starvation.

PREVENTION

In order to prevent the further spread of this insect, and this at present is our chief object, florists should be guided by the following recommendations:

(1) Whenever possible, growers should propagate their own roses.

(2) New stock should be obtained from non-infested greenhouses.

(3) Rose plants and scions purchased through commission houses or from places not known to be free of midge, should be imported before the end of February. This recommendation is made because such stock, provided it has been planted in November or December, will not have been exposed to infection.

(4) Greenhouse-grown roses, brought in later than February, should be carefully examined for Rose Midge injury, and any infested plants should be destroyed. In addition to this, the soil should be washed off the roots of the plants and should then be thrown into the furnace or scalded with hot water or steam.

NOTES ON THE TUSSOCK MOTH *HEMEROCAMPA VETUSTA*
GULOSA HY. EDW., IN BRITISH COLUMBIA

BY W. B. ANDERSON, DOMINION ENTOMOLOGICAL LABORATORY, VICTORIA, B.C.

IN early August of last year, (1917) when at Hedley, in the Similkameen Valley, B.C., my attention was called by a resident of the place, to a caterpillar which was devastating a grove of young Douglas Firs (*Pseudotsuga mucronata*) which he had planted several years before near his home.

Upon examination, I found the caterpillars to be the larvæ of some species of Tussock moth, but not finding any of the mature insects upon the occasion of my visit, I was unable to determine what it really was. One special feature dwelt on by my informant was that upon contact of the caterpillar with the human skin, a violent and painful rash was set up, and as at a later date the pests became quite numerous, crawling over piles of firewood, rails of fences, etc., avoidance of contact became difficult and the inmates of the house were in a constant state of irritation.

On August 6th, 1918, when at Chase, B.C., on the Thompson River, people were complaining of the ravages of some insect which was attacking the Douglas Firs about the town. Upon investigation, I found the insect to be identical with the Hedley pest of the previous year. It was said to have appeared in the vicinity of Chase about 1916 and at the time these observations were made had spread over and destroyed a tract of about half a mile by about a quarter of a mile in area. Upon this occasion I was fortunate in

securing larvæ, male and wingless female moths and cocoons, in which many of the pupæ were parasitised. These parasites will probably emerge early next summer.

While Douglas Fir appears to be the main food plant, the Yellow Pine, *Pinus ponderosa*, is also attacked but much more sparingly, although the limbs of some of these trees were literally covered with the cocoons.

The attack seems invariably to begin operations at the top of the tree and to work downward. In most cases the entire tree was defoliated, though in some cases injury ceases at a certain point in the umbrage, suggesting that the colony had arrived at full growth, and pupated at about that point. In all such cases the defoliated portions had evidently been killed outright, there being no signs of later growth on these parts, as in the case of the Spruce Budworm, (*Harmaloga fumiferana*) hence at intervals one could find a tree with the top apparently dead and the lower untouched portions still green and flourishing. In those cases where the tree was altogether defoliated, it was found to be quite dead.

Being of so destructive a nature, the infestation might well be viewed with alarm, except for the fact that the females are wingless, and thus unable to travel any distance. Even as it is, many trees in the village of Chase, the pride of property owners, have had to be cut down owing to serious injury by the insect.

THE HEALTH OF ANIMALS BRANCH

RESEARCH WORK ON POULTRY DISEASES

BY A. B. WICKWARE, ASSISTANT PATHOLOGIST, BIOLOGICAL LABORATORY, OTTAWA

FOR a number of years investigations have been conducted in Canada, to determine the nature and prevalence of diseases of poultry.

The need for further research is emphasized by the fact that the exigencies of war-time have given a stimulus to the poultry industry, and it is natural to assume that this additional interest has led to an increase, rather than a decrease, of poultry disorders.

When the work was first started by this department, very little was known about the diseases of fowls in this country. In order to cover the ground thoroughly, poultrymen were requested by press notices, correspondence and personal appeals to co-operate as fully as possible by sending in sick and dead birds for study and diagnosis. In pursuance of this policy, the department guaranteed express charges, and in the last five or six years, the examination of specimens has become a task of considerable magnitude.

It therefore seems timely, when economy is the watchword, to make a few suggestions as to what work we desire to undertake, and to point out the various causes which result in individual deaths in flocks, and which can be easily recognized by the poultryman at home. In this connection, it may be pointed out that live and dead fowls are frequently forwarded to us via express from remote districts in British Columbia, Alberta and Saskatchewan, and the expense of transporting these birds is wholly unjustifiable where the losses are limited to one or two fowls.

From a study of our records, individual losses may be attributed to the following conditions, none of

which can be transmitted to other members of the flock:

Affections of the Heart.—These are usually manifested by a quantity of fluid within the covering membrane, and in some instances by an accumulation of yolk-like material, the result of inflammation.

Rupture of the Liver.—This occurs in fowls which are excessively fat, and is recognized by sudden death, and the filling of the bowel cavity with blood.

Apoplexy, or rupture of a blood-vessel in the brain. This disease can be determined only by the absence of other lesions, and the suddenness of death.

Peritonitis, or inflammation of the bowels and covering membranes. Peritonitis is caused by the partial development of eggs in the bowel cavity; closure of the egg-duct by large eggs; or accumulated yolk material, etc. Frequently the diseased ovary is responsible for this latter condition.

The above diseases are those usually responsible for individual deaths, and may easily be detected by examining the birds.

The infectious diseases which spread rapidly through flocks concern us chiefly. Such diseases as Fowl-cholera, Tuberculosis, Blackhead in turkeys, Roup and Coccidiosis may be classified as infectious, and it is essential that they be recognized early, so that their spread may be checked.

Worms are also very troublesome, and we have already published directions for getting rid of these parasites. These bulletins may be obtained upon application to the Publications Branch of the Department.

If poultry owners desire to have parasites identified, the parasites—

preserved in alcohol and securely packed—may be sent by mail to the Laboratory

With reference to Tuberculosis and Blackhead, our bulletins fully describe these two diseases, and any poultryman should be able to diagnose them after reading our literature and seeing the illustrations.

To prevent misunderstanding of the aims of the department, we wish to restate that we are desirous of investigating affections which are responsible for large losses.

In cases of suspected poisoning, a public analyst should be consulted, as we do not undertake work of this nature.

As previously stated, where only one or two deaths occur, the express charges usually total more than the market value of the birds.

We trust, therefore, that poultrymen will assist us in our economic policy and send fowls only when several deaths have occurred simultaneously and the cause cannot be determined at home.

THE DAIRY AND COLD STORAGE BRANCH

PRE-COOLING AND FRUIT STORAGE INVESTIGATIONS.

BY C. M. BONHAM, SUPERINTENDENT, GRIMSBY PRE-COOLING AND EXPERIMENTAL FRUIT STORAGE WAREHOUSE

THE work at Grimsby Pre-cooling and Experimental Fruit Storage Warehouse has been carried on during 1918 along pretty much the same lines as 1917, very little outside of commercial work being undertaken. Notwithstanding the scarcity of some fruits and the unusually high prices and strong demand in local markets for most lines throughout the season, the plant was very extensively patronized, the volume of fruit handled being slightly over that of the two previous seasons.

Raspberries were the first fruits received for storage and a considerable quantity was handled this year for the canning factories and other purposes. No difficulty has been experienced in holding raspberries for a week to twelve days for preserving purposes, provided the fruit is fresh and firm when delivered. Besides the storage for local factories one pre-cooled carload was shipped to Sarnia, Ont.

As usual sour cherries were the first fruits offered for pre-cooling for western carload shipment. The movement of Richmonds and Montmorencies to the western provinces was not heavy, being due to the unusually light crop together with

very high prices and a strong demand from Ontario and Quebec markets. Altogether five pre-cooled cars of cherries were shipped. Three of these went to Winnipeg, one to Brandon and the fifth to Oshawa, with satisfactory results in each case. The usual quantity of cherries was stored for the canning factories, etc., but on the whole the volume handled was not large, being about the same as that of 1917.

In neither of these years has there been sufficient crop to make it necessary to find an outlet in the western market. Shippers have endeavoured however to furnish their western trade with a few cars in each of the past two seasons, since these connections will prove of great value to the growers in a year when cherries are more plentiful.

The season this year was slightly earlier than in 1917. The shipment of plums, pears, tomatoes and other of the fall fruits commenced on August 21st. During the period between this date and October 19th thirty-seven cars were pre-cooled, all but seven of them being handled during the month of September. Twenty-five cars went to the Prairie Provinces, five to Quebec and the

Maritime Provinces and seven to Ontario. Of the cars shipped to the Prairie Provinces a large percentage went to Winnipeg, but shipments were made to Edmonton, Prince Albert, Regina, Moosejaw and other points.

In order to keep advised as to the condition in which cars were arriving the writer arranged with Mr. F. H. Steele, Chief Fruit Inspector for the Prairie Provinces, for an inspection and either a written or a telegraphed report as might be requested. These reports gave us helpful information throughout the season.

As a rule cars for the West are made up very largely of the following: Damson, Reinclaude, Fancy Blue (several varieties), and Burbank plums, tomatoes, Bartlett pears and Elberta peaches. It must be understood however that practically all varieties of plums, pears and peaches respond favourably to pre-cooling, and many varieties besides those mentioned are used for shipment to the western provinces although the heavier production and suitability of those noted above places them in a place of prominence in this regard.

With the exception of one or two cases in which the shrinkage was only on a few tomatoes and Lombard plums, inspection reports indicate that the fruit was received on the western markets in first class condition and gave good satisfaction to the trade.

Next in importance to the extension of markets through pre-cooled carlot shipments is the use made of the plant for storage purposes. Approximately thirty cars were handled in that way this year. Pears were stored extensively with a view to extending the marketing season and a considerable quantity of peaches was also stored with this end in view. Plums however comprised the greater percentage of this class of

storage during the past season. The shortage of sugar for canning purposes gave rise to a very serious condition as it made it very difficult for growers and dealers to make sales which would take care of the fruit as it was picked. However, the seriousness of the situation was materially relieved through the storage of a considerable number of cars, and as far as the capacity would permit the Grimsby plant helped the producers over a very awkward period and enabled them to hold their plums until they could be disposed of. This applied particularly to Reinclaudes of which there was a heavy crop in the Grimsby district this year. For some time during the picking season, and after, we carried a balance of from five to six cars of this variety in stock, shipments being made as rapidly as markets could be found and fresh stock being taken in as space became available.

Following is a statement of fruit handled for the season:

STATEMENT OF FRUIT HANDLED TO NOVEMBER
1 FOR SEASON OF 1918.

<i>Fruit.</i>	<i>Pounds,</i>
Cherries.	140,000
Raspberries.	41,700
Red Currants	2,600
Black Currants	8,000
Gooseberries	2,500
Plums.	467,300
Tomatoes.	262,500
Pears	213,340
Peaches.	88,700
Apples (in baskets)	42,000
Cantaloupe.	3,200
Grapes	50,000
Miscellaneous fruits and vegetables.	15,700
Total.	1,337,540

DISTRIBUTION OF PRE-COOLED CARLOAD
SHIPMENTS.

	<i>cars.</i>
Prairie Provinces.	29
Quebec and Maritime Provinces.	5
Ontario.	8
Total.	42

THE FRUIT BRANCH

CANADIAN APPLES IN GREAT BRITAIN

BY C. W. BAXTER, FRUIT COMMISSIONER

IN the December issue of the Gazette the conditions immediately following the lifting of the apple embargo were outlined. Since that article was prepared approximately 100,000 barrels of apples have been exported and considerable quantities are still going forward.

When it was announced on November 25th that the ocean freight rate had been fixed at \$5 per barrel and \$2 per box, there was a strong protest made by box shippers. It was pointed out to the British authorities that, with an ocean rate of \$2, the laid down cost in England was only very slightly less than the fixed maximum price and, in the case of shipments from British Columbia, was actually more than the fixed price. The British Ministry of Food stated that they were con-

cerned only with the importation of apples as a cheap food; boxed apples were considered a luxury, and the question of raising the maximum prices on boxed apples, in preference to barreled stock, could not be considered.

The attention of the authorities was then drawn to the fact that a rate of \$2 on boxes, as compared with \$5 on barrels was a discrimination in favour of boxes, inasmuch as the actual weight of barrels was three and one-half times that of boxes. This resulted in the lowering of the ocean rate on boxed apples to \$1.25, a reduction of 75 cents per package.

Up to the end of December, the quantity of apples exported or then loading at point of export was approximately as follows:—

Nova Scotia	75,000 barrels.
Ontario....	20,000 "
British Columbia	7,000 boxes.

The primary distributors' maximum prices, as fixed in Great Britain, are: 58s. 4d. per barrel on Nova Scotian apples, 67s. 8d. on Ontario apples, and 19s. 9d. per box. Reports so far received, on all sales up to January 7th, show that Canadian apples have realized these maximum

prices, regardless of varieties and grades. The only exceptions have been in the case of shipments which were frosted or otherwise damaged.

The following table gives the selling price of recent shipments allotted in rationed quantities or sold at auction:—

Place of Sale.	Date.	No. of Packages.	Price.	Ex. S.S.
Liverpool.....	Dec. 28,	575 boxes, (B.C.)	Maximum	Cufic.
"	" 20,	1,914 bbls. (Ont. & N.S.)	"	Scandinavian.
"	" 20,	16,000 bbls. (N.S.)	"	Rijsbergen.
"	" 30,		Few Max.	
			Balance:	
			1's 46/65	Scotian, (Some
			2's 50/66	frosted).
			3's 50/61	
"	Jan. 7,	7,000 bbls. (Ont. & N.S.)	Maximum	Minnesota & Melita.
Glasgow.....	Dec. 28,	649 bbls. (Ont.)	"	Saturnia,
"		600 boxes (B.C.)	"	(Some frosted).
"	Jan. 7,	5,265 bbls. (N.S.)	"	Titan.
London.....	" 7,	6,400 bbls. (N.S.)	"	Sardinian & Pretorian.

THE SEED BRANCH

TESTING WESTERN CANADA SEED GRAIN

BY JOHN R. DYMOND, B. A., ACTING CHIEF SEED ANALYST

THE extent of the Western grain crop is of interest to all Canada and therefore the quality of the seed used in its production is of national concern, but seed testing is especially important to the Western grain grower as an individual, because the vitality of his grain is more often impaired by frost than is that in other parts of Canada.

Seed of strong vitality must be used in order to get an even stand of strong, vigorous plants that will keep weeds in check, withstand adverse weather conditions and mature before frost comes.

The Federal Department of Agriculture now has two seed laboratories in Western Canada; one at Calgary established in 1907, and one in Winnipeg opened in October, 1918.

From September 1st to December 31st, 1918, 2,677 samples were tested at Calgary and 2,255 at Winnipeg as compared with 1,694 for the same period at Calgary last year.

Of the 4,932 samples tested in the two laboratories 3,328 were oats 174 wheat, 270 barley and 1,160 vegetable, grass and miscellaneous seeds.

VITALITY OF OATS

The average germination of the oats tested is between 80 per cent and 85 per cent. About 20 per cent. of the samples received may be said to be of good, strong vitality, while an additional fifty per cent will make fairly good seed if well cleaned. About thirty per cent are from grain too low in vitality to be depended on to produce successful crops.

CLEANING IMPORTANT THIS YEAR

On account of the unusually high proportion of light oats in last season's crop, it is especially important in cleaning to use a sufficiently strong wind blast to remove all the

light kernels. These light oats may germinate but their vitality is low. They are slow to come up and produce weak unproductive plants.

A very large proportion of the oat samples as received contains considerable numbers of wild oats and other noxious weed seeds. Many of the smaller weed seeds can be removed by careful cleaning, but little can be done in the way of reducing the wild oat content by the ordinary fanning mill.

BARLEY

Barley is very susceptible to injury by frost and other unfavourable climatic conditions. About 40 per cent of the samples we have tested show good strong vitality while probably 40 per cent more may be depended on to produce satisfactory crops. The average germination is between 85 per cent and 90 per cent

WHEAT

Most samples of wheat show good vitality, the average germination being between 90 per cent and 95 per cent. Occasional samples show frost or other injury sufficient to lower their vitality below the point where they should be depended on for seed.

NEVER SAFE TO SOW UNTESTED GRAIN

The vitality of grain may be injured by such a variety of climatic and storage conditions that one should never use it as seed without first testing its vitality. The trouble and expense involved is so trifling in comparison with the value of the crop that it should be unnecessary to urge its importance. Even the value of the grain put into the ground as seed is sufficient to warrant every precaution necessary to determine its suitability.

PART II

Provincial Departments of Agriculture

POLICIES TO DEVELOP THE LIVE STOCK INDUSTRY

PRINCE EDWARD ISLAND

BY. W. J. REID, B.S.A., DIRECTOR OF AGRICULTURAL INSTRUCTION

THE basis for a live stock trade is well founded throughout Prince Edward Island. During the past four years the patriotic appeal, when backed by the economic necessity for a general enlarging of the herds and flocks, has been given



MR. W. J. REID, B.S.A.

a sympathetic hearing. Even previous to 1914 there was a delayed but logical movement toward more and better farm stock, due to the gradually improved methods of market classification and rise in prices. This properly inclined but suspended progress was the factor that made the launching forth at full capacity a problem worthy of serious effort. The trade, incident to the war, has acted as a stimulant in promoting the industry faster than its normal

development could possibly provide and have an assured future, while to-day its present and future state rests with the degree of permanence that can be established in the European markets for Canadian products.

With the rapidly increasing demands of the markets for four years at prices without precedent, the live stock breeders of Prince Edward Island have had an experience that enforced its conclusions as nothing else could. It has indicated the value of live stock over the grain farming that a part of the province had been following too consistently. It has indicated that the live stock capacity of the province has been seriously underrated, and as yet has only a part of the numbers it should have, especially in view of the vast need that has developed in Europe. It has also indicated that improvement in quality pays its own dividends, and that the Province as a part of Canada must assume its share of the obligation and opportunity in supplying the depleted markets of Europe.

Our most critical time was when the rapid advance of markets prompted the inclination of many breeders to sell the most of their stock on what was to them a market of short duration. As a solution, a series of Agricultural Short Courses was planned for the winter of 1915. These were held at the principal centres throughout the Province, and were of one week's duration in each. At each centre information, in the form of bulletins, lectures and demonstrations, was given with the object of establishing a proper interpretation of the markets and strengthening

the industry generally. Types and breeds, with the care and management of each class of stock, were discussed. This, with the other phases of a general Agricultural programme, maintained an interest and established a confidence that has been productive.

Many of the community organizations that are responsible for the first welding together of individual interests trace directly to the local short course in Agriculture, which is now a permanent part of the year's work. Foremost among these are Community Breeding Clubs. As these are generally conceived of they each consist of a number of individuals interested in the same breed or type of animals banded together, usually operating under a constitution and set of by-laws with elective officers and stated places and dates of meeting. Their co-operative effort is for the advancement of that breed or type in their own community. This community interest in efficient farm animals carries with it the development of agricultural practices and community prosperity, and the particular advancement of those individuals directly interested.

In a brief statement the objects of each club might be stated as follows:

- (a) To procure and use pedigreed sires of merit for the purpose of improving our herds through systematic breeding.
- (b) To encourage the purchase and use of pedigreed females for the up-building of the community herds.
- (c) To establish a community sales board as a means of disposing of the surplus stock owned by the members through private sales, auction sales, and other means.
- (d) To establish the testing of all herds for tuberculosis, (in the case of cattle).
- (e) To establish the keeping of individual records, (in the case of dairy cattle).
- (f) To establish among the breeders of the community, and all interested persons in general, a recognition of the value of community breeding and of the stock owned by the club members.

The club shall seek to obtain these objects by:—

- (a) Striving for and preserving the co-operative spirit for mutual protection and benefit.

(b) Acting in conjunction with other similar societies throughout Prince Edward Island.

(c) Establishing a standard for all live stock disposed of, thereby securing a reputation for the club and for Prince Edward Island.

From each district where such an organization has been established, there has been a steady demand for foundation stock to start or enlarge the herds of associated members. From a small beginning in 1916 the distribution has grown, until, during 1918, it included four carloads of registered sheep, one carload of Holstein females, and one carload of breeding sows, with several smaller consignments of Ayrshires and Shorthorns. It should be mentioned that this includes only the shipments from other provinces and that a constant trade within the province has grown until such was a necessity.

In all cases the Department of Agriculture, when solicited, has acted as the buying and distributing agent. The animals were purchased in as large lots as possible, so that the costs of transportation and care could be reduced to a minimum. The distribution is at cost and the scheme in total has proven fully satisfactory.

As an associate of the Community Breeding Clubs, a beginning was made in the spring of 1918 to establish Pig and Poultry Clubs among the junior members of rural communities. This organization is conducted through the Rural Science Department of the Prince of Wales College, working in conjunction with the Departments of Agriculture and Education. The objects and governing rules are simple. The members are encouraged in the work with the hope of strengthening their liking for live stock in general, and their own selecting in particular. Each body of members is bound to the breed selected by the majority, and rules governing the ownership, care and management, are enforced by a directorate of their own selecting. The product of their work formed an interesting part of the local school fairs held in September.

For a number of years the Farmers' Institutes of the Province have been a vital force in keeping the live stock interests of many communities on a progressive basis. The co-operative ownership of registered sires is conducted either by the members making the joint purchase and hiring a caretaker, or, one member owning the animal and being subsidized by the others. A special government grant has been provided for those who desire to make such purchases co-operatively. This has been responsible for the use of desirable sires, especially in districts where the size of the herds does not justify individual ownership. A second and most commendable work of the Institutes is the co-operative selling of lambs during the marketing season. The number of lambs owned by members are entered for sale and tenders are called for by advertising. On a given date the tenders are opened and the lambs sold to the highest bidder. Due to the low rate of

expense connected with the buying, this method of selling nets the producer from $\frac{1}{2}$ to 1 cent per pound over the usual rating for individual lots. It has also produced an increased interest in the number and quality of lambs offered. One report is on record that shows an average general increase in weight of 20 pounds per lamb as the result of improved breeding and care for a short term of years. A proposal has been made that a general sale be conducted for the Institutes in total, and such will undoubtedly be carried out.

The following figures represent the provincial live stock statistics compiled by the Department of Agriculture from authentic sources for 1918:

Horses, 32,547; milch cows, 41,429; other cattle, 69,082; sheep, 73,046; swine, 40,814.

It is hoped that through the co-operating interest of all concerned the live stock industry of P.E. Island will continue to make progress.

NOVA SCOTIA

BY PROF. M. CUMMING, SECRETARY FOR AGRICULTURE.

THE best efforts which the Department of Agriculture of the Province of Nova Scotia have put forth to develop the live stock of the province have been in regard to improving the quality and increasing the number of dairy cattle. This has been largely done through the policy of encouraging co-operative creameries and assisting them in marketing their product and by encouraging cowtesting and carrying on a general propaganda in connection with these creameries. The results have been eminently satisfactory. An increase in the past decade of over 1,000 per cent in the product of the creameries is reflected by a corresponding development in dairy cattle.

We have not done very much to help out beef raising, except in so far as our general agricultural Society policy, which I will refer to at the end of this communication, is concerned. The facts are that at the

present time the beef industry in the province is in a serious position. There are large numbers of semi-finished beef cattle which have heretofore either been bought by the feeders or by butchers but for which there is at the present time no satisfactory market.

There is no large abattoir anywhere in the Maritime Provinces to take care of the prime stock, as well as of stock of the kind described. If it were feasible, we would like, with the co-operation of the federal Department of Agriculture, to work out some plan by which a stock yard and abattoir facilities could be available to the farmers of the three Maritime Provinces.

Since, owing to scarcity of feed, our live stock feeders are not buying this unfinished stock for feeding purposes, and since there is no substantial market for these short of Montreal, in reaching which market

a large toll has to be deducted for freight and other incidentals, we are compelled frankly to acknowledge that our market facilities are not what they ought to be. However, we cannot give substantial support to the development of this business.

In respect to sheep, the Provincial Department in co-operation with the Federal Department of Agriculture have imported and distributed this last year upwards of 300 pure bred rams and have also facilitated the distribution of ewes that would otherwise have gone to the butcher, with the result that a substantial increase in the number of sheep in the province and some improvement in quality will be effected. Fortunately the market for wool and mutton is very satisfactory.

Hog raising suffers somewhat from the same difficulties referred to in the paragraph on beef raising, although not to quite the same extent for there are limited abattoir facilities for these and as a rule farmers have no difficulty in disposing of the pork they raise.

Last fall, simply owing to the appearance of articles in the press and speeches delivered at meetings, the farmers made a very considerable increase in their hog holding. This end of the business, however, could be further stimulated if abattoir problems were solved.

In so far as the general improvement of all classes of live stock is concerned, Nova Scotia has a very good system of Agricultural Societies. When not less than 15 members start a society, each member subscribing from \$1 to \$5 or \$10 each, the Government, under its Agricultural Society policy, supplements this by granting an equal amount

and the funds so accumulated are used by these societies for the purpose of purchasing pure bred sires of all classes. This policy has worked out splendidly in some sections of the province and is giving increasing



PROF. M. CUMMING, B.A., B.S.A.

satisfaction in the new sections of the province. In the past ten years the number has increased from 160 to some 290.

When a normal feed situation is restored, there is no doubt that these combined measures such as already exist in the province will be instrumental in decidedly improving the quality and to some extent the quantity of live stock in the Province of Nova Scotia, but there is room for a lot more work, the main part of which is the marketing of live stock and live stock products.

NEW BRUNSWICK

BY THOS. G. HETHERINGTON, B.S.A., SUPERINTENDENT, LIVE STOCK AND DAIRY DIVISION,
DEPARTMENT OF AGRICULTURE

A SUMMARY of the general conditions as they exist in New Brunswick is necessary before the outside reader can fully

appreciate the work of the Department in the Province.

This province has never been seriously considered by the outside

world as a livestock country, and while it is very true that the province's past performance along the line of livestock production has not been very creditable, yet this does not signify that the possibilities for stock production do not exist. Natural conditions are favourable for a wide expansion, but many conflicting factors have prevented the fulfilment of this possible growth. These might be enumerated as follows:—

(1) The lumber industry. The farmers farm in the summer and lumber in the winter



MR. THOS HETHERINGTON, B.S.A.

(2) Specializing in potatoes, with slight attention to livestock. This practice is general in several of the best agricultural counties of the province.

(3) Extremely poor facilities for marketing stock in any quantity. So far as the farmer is concerned, it is practically a retail trade.

(4) Lack of appreciation of the value of the pure bred sire, i.e., the scrub bull, the scrub hog, the scrub ram, and the scrub stallion are all very much in evidence. Farmers are only just beginning to appreciate the

value of grading up the farm stock.

(5) A considerable portion of the hay crop is exported.

Suffering from these handicaps, it is not particularly strange that advancement has been slow. The country drovers, while providing practically the sole outlet for livestock and livestock products, have been a serious hindrance to the promotion of the industry. For instance, their motto has been to get the stock as cheaply as possible, often doubling their money on a single turn-over. This policy, followed up year after year, has led to a general decline in the production of meat and mutton. This narrow-minded policy on the part of the drovers has almost entirely killed the sheep industry.

The scrub sire plays a big part in the general scheme of things. The too general use of the scrub has prevented provincial breeders from widening and expanding their business; as a result, the sale of pure-bred stock has been slow and at prices scarcely above meat quotations. This has re-acted on the quality of the stock bred.

DEPARTMENTAL ACTIVITIES— SHEEP.

It is generally conceded that New Brunswick is better able, due to natural conditions, to compete with other countries in sheep production than she is in the production of any other class of stock. Consequently this branch has been emphasized. For two years large importations of pure bred rams have been made by the Provincial Department of Agriculture; likewise, a considerable number of pure-bred ewes and grade ewe lambs.

At the 1917-18 session of the legislature a credit scheme for the purchase of sheep was formulated. This provided the machinery so that farmers could purchase twenty sheep and one pure-bred ram by paying one-third cash and giving a note for one year at six per cent interest for the balance. This legislation has been a boon to the sheep industry,

and along with the departmental propaganda, has given the industry an impetus that we think will tide it over the period of lower prices that are predicted.

In 1917 about fifty pure-bred rams were imported for the farmers of the province. The 1918 importation was over three times as large and will have a corresponding effect on the quality of lambs produced another year. The Federal Department of Agriculture has assisted very materially, through its policy of paying freights on car lots from place to place, on stock intended for breeding purposes. Likewise, the Federal War Measures Act, for assisting in the purchase of rams, has enabled farmers to secure real high-class sires at a reasonable price. Practically all of the rams imported this year from Prince Edward Island were exhibited and winners at the Charlottetown Fair. Forty-nine rams were imported from Ontario and were an unusually high-class lot. The importation of nineteen Cheviot ewes and rams from the State of Maine will provide a foundation stock of this popular and hardy breed for the province.

Co-operative marketing of wool was generally introduced in 1918, and has resulted in the wool growers receiving from ten to fifteen cents per pound more than otherwise would have been the case. This work will be more general next year.

The Department's plans for the future in relation to the encouragement of the sheep industry are not fully outlined. This winter all of the stock, grade and pure-bred, distributed by the Department, will be gone over and treated for ticks and lice; likewise, all of the lambs will be docked. In the spring a series of dipping, docking, castrating and shearing demonstrations will be begun. The co-operative marketing of wool will be featured more than ever. In regard to the distribution of stock next year, no fixed policy has as yet been decided upon. However, it is assumed that this year's activities will have created an interest

which will cause a steady increase in the grade of sheep population, and it is believed that the demand for pure-bred rams will be such that little, if any, attention can be given to the distribution of grade stock. Finally, an attempt will be made to discourage the breeding of ewe lambs which is generally practised.

In conclusion, the big drawback—poor facilities for marketing—still exists. The creation of a central abattoir for the maritime provinces has been discussed and will possibly materialize. Future development depends upon the establishment of a central, subsidized abattoir.

BEEF AND DAIRY CATTLE

The area suitable for beef production, from a marketing point of view, is much greater than that for dairying. The creation of central co-operative creameries is acting as an incentive to the dairy business.

In the spring of 1918 a Farmers' Co-operative Creamery was established at Moncton, and has been a success from the start. Further effort along this line will foster the industry and at the same time will help towards increased production per cow and towards the use of better sires.

The beef trade is local in character, the major portion of the product is utilized by the lumber camps and saw mills. The quality is not what it should be, this having a corresponding effect on the price received. The production of beef is on the increase. Both the dairy and beef interests suffer, due to the fact that concentrates are not grown on the farm, likewise it has been clearly demonstrated that corn silage is not a dependable crop.

The Department's activities towards the production of better beef and dairy cattle thus far has been limited to the bonusing of pure-bred bulls and the importation of herd sires for the breeders. The system of bonusing pure-bred bulls is conducted through the medium of the agricultural societies, of which there

are upwards of one hundred and seventy-five in the province. An initial bonus of 20 per cent of the purchase price is granted and succeeding bonuses of 10 per cent of the purchase price for each year the bull is kept by the society. I feel that this system is faulty, not obtaining the desired improvement, and contemplate the fixing of a minimum purchase price and very strict inspection before purchase as well as rigid supervision after purchase. Until this can be done real progress must be slow.

Breeders' consignment sales will be encouraged to the fullest extent. This year the first breeders' consignment sale was held at Fredericton with fairly good results.

SWINE

Pork production in New Brunswick as a side-line is not very general. Little has been done in the past along the line of bacon production, due to the lack of a market that demanded this class of product. Farmers depend on the lumber camps as an outlet. This trade demands an extremely fat type of hog.

The Department has established Boys' Breeders' Clubs in all the counties of the province. The boys are provided with a pure-bred sow each, and one member of the Club is provided with a boar. Improvement is expected from this work. This year about twenty clubs were organized, and the first series of fall pig fairs was held. The interest shown in this movement, both by the boys and the parents, augurs well for the future of the swine breeding business. In all about two hundred pure-bred sows were distributed this year. The financing of these clubs was looked after by well-to-do citizens of the province, interested in the development of livestock as well as in the future farmers of the country.

Another reason why the swine industry has not made the advancement it should have, is that the system of pen feeding has been

practised almost exclusively. This year the Department undertook to establish demonstration pig pastures in representative districts of the Province. About fifty of these demonstration plots were established, featuring standard pasture mixtures, and in the majority of cases the farmers were well pleased with the experiment. The seed was provided, likewise the necessary fencing, and with the understanding that if continued for a period of years the fence provided would become the property of the farmer.

Future effort towards the encouragement of the swine industry will mainly be through attention to the Pig Clubs, assistance along the line of demonstration pig pastures and the importation of pure-bred stock for the farmers.

HORSES

The horse industry has probably received less attention in the past than its importance warrants. Hundreds of carloads of draft horses are imported annually for use in the lumber woods and in towns and cities. The quality of the imported stock has been inferior, eastern buyers bringing in from the west the low-priced stock. Better horses could be produced right at home, and a good market is at hand, providing the importation of cull stuff can be controlled. This, in a measure accounts for the backwardness of the industry in the Province.

At the 1917-18 session of the legislature a Stallion Inspection and Registration Act was put in force, practically giving the Department control of this phase of the work. Year by year the scrub and inferior pure-breds will be eliminated. The yearly inspection gradually becomes more severe. This winter special attention will be given to the interests of the horse men. It is our purpose to organize a number of Stallion Clubs and to take advantage, in so far as possible, of the Federal Department's assistance in this respect.

SUMMARY

The stock industry in this Province is just at the point where real advancement could be made—an expansion on a wholesale scale cannot be brought about unless the facilities for marketing are available. The farmers are keenly interested, but must be assured of an outlet. Departmental activities, no matter how vigorous, cannot overcome this, and at the same time much of the De-

partmental work will bear little fruit unless this condition is remedied.

Much is expected from the club movement in sheep, pigs, and stallions. The attitude of the farmers towards better stock was never better. A Provincial Livestock Association is in the process of organization; progressive men are behind it, and this is bound to be a big factor towards the promotion of more and better livestock.

QUEBEC

BY OSCAR LESSARD, SECRETARY, QUEBEC COUNCIL OF AGRICULTURE

IN view of the scarcity and ever increasing prices of meat and dairy products, and on account of the lack of agricultural labour, the Quebec Department of Agriculture has endeavoured, by sustained efforts, to so direct the activities of agricultural associations as to encourage the farmers to breed better animals, and, by so doing, improve the quality and value of their live stock. The campaign launched in 1917 under the wise and practical direction of the Honourable Mr. Caron has already given gratifying results. Strong endeavour was made to develop on more scientific lines the breeding of horses, cattle, swine, sheep, and the great improvement that has been noted will greatly help in this progressive movement. The new lines of action that may be added to the programme of future years after a more thorough study of the question, will not fail to contribute largely to the improvement of breeding.

HORSES

The breeding of horses has been taken up by a fairly large number of agricultural associations, established in all the counties of the province. Our province being essentially agricultural, it was realized that the introduction of good draught horses would be very useful. The Percheron, Ardennais and Canadian horses are known to be the most suitable for the needs of the farmers. Of course,

other breeds are not entirely left out, as some are met with in various districts. Endeavour is made, above all things, to urge the adoption of this rule: stick to the same breed, and work constantly to its improvement. Past experience has shown that too frequent changes of breeds have gradually brought about the degeneration of good horses.

Our Department helps the agricultural associations by allowing them special grants, paying in part for the maintenance of the horses which they keep. The associations are also allowed to use their regular funds to purchase good breeders and care for them. Again, to encourage them to select the best specimens of the breed, the Department lends the necessary money, without any interest, and places its experts at the disposal of the associations to help them to secure the animals which they desire; but before the latter are accepted, they must undergo a strict examination, by a competent veterinarian and be declared to be first class, free from any defect, and in possession of individual qualities making them specially desirable for breeding. These horses are inspected from time to time by the Department's experts who may at such visits, give useful advice regarding their care and maintenance to the directors or the keeper.

Furthermore, to help this movement for the breeding of better horses, the Department purchased lately at the Chicago exhibition

fourteen Percheron fillies and two stallions of the same breed. These animals which are of a high value are now at the school of Agriculture of Ste. Anne de la Pocatiere and will shortly be offered for sale. Let us hope that progressive farmers will not fail to take advantage of this opportunity offered by the Department.

CATTLE, SWINE AND SHEEP

The breeding of cattle, swine and sheep is an important item in the programme of farmers' clubs, of which there are now more than 750 in our province. The activities of a club being limited to the parish or to the municipality in which it is organized, their ever increasing number shows that the great majority of the farmers are benefited by these organizations, the main object of which is the improvement of live stock.

The Department, knowing that this industry is a source of considerable revenue to the farmers, encourages farmers' clubs to purchase dairy stock of Ayrshire, Canadian, Holstein, and Shorthorn breeds. However, no objection whatever is made to the raising of other breeds which, in some localities, may yield good profits. The Department also helps clubs to purchase live stock of superior quality and known to belong to a good dairy family. In addition, it is required that every animal be submitted to the tuberculin test and found free from tuberculosis. This is strictly insisted upon in order to control this serious disease which has caused so many losses in the herds to-date.

Subsidies granted to the clubs will enable them to introduce better breeds of pigs and sheep in their locality. The Department recommends to those farmers who are in the proximity of slaughtering houses, to keep pigs of bacon breeds, either Yorkshire or Tamworth, as these two are the best for this purpose in general and give the best satisfaction. Of course other breeds such as the Chester White, Berkshire and others may

also be profitable in some parts of the province.

Taking into consideration the various characteristics of soil and climate in the different parts of the province of Quebec, the Department proposes to encourage the breeding of a large number of suitable breeds of sheep among which are the following: Leicester, Lincoln, Cotswold, Shropshire, Oxford Down, Hampshire, Cheviot, etc.

The Department follows the same system towards farmers' clubs, as regards the purchase of good breeding stock of the bovine, porcine and ovine species. Competent experts are placed at their disposal, who endeavour to select the breeds which are the most suitable in their locality. The same official also visits the animals kept and give advice to keepers regarding the care to be given, etc.

Each year, in the month of October, the Breeders' Association holds two auctions sales of registered animals, purchased with care by experts and selected among the herds of the best breeders of Quebec and Ontario. Another auction sale is also made at many railway stations. In 1917 the latter sale was made at the larger stations between the cities of Levis and Rimouski, and in 1918 between the cities of Quebec and Chicoutimi. A few hundreds of animals of merit were thus introduced in various parts of the province. To ensure the success of such sales, the Department guarantees the Breeders' association against any deficit that might occur.

Before concluding, it may be added that the Quebec Department of Agriculture appropriates yearly the sum of over \$85,000 to help agricultural associations and farmers' clubs to secure the best registered animals for breeding, and the results obtained therefrom show that farmers are interested in this progressive movement.

Several packers, whose words cannot be doubted, have lately declared to the Honourable the Minister of Agriculture that pigs from the pro-

vince of Quebec received this year at packing houses are much better finished than in past years. This statement sums up all that might be said in praise of the efforts made by

the Department to encourage the breeding of good animals, and thus secure a greater revenue from our animal wealth.

ONTARIO

BY W. BERT ROADHOUSE, DEPUTY MINISTER OF AGRICULTURE

THE outstanding fact in regard to the live stock situation at the present time is the present and prospective demand for live stock and live stock products. The outstanding feature of the live stock work of the Ontario Department of Agriculture is to keep this fact prominently before the farmers and stock raisers of the country. In doing this attention is paid to three points—breeding, feeding, marketing.

BREEDING

In regard to breeding emphasis is of course placed on the desirability of quality, and the special Live Stock Exhibitions and Short Courses are used to emphasize this point. It was noted at the Winter Fair at Guelph a few weeks ago that the quality was possibly higher than in any previous year. The Winter Fair at Ottawa will be held again this year after a lapse on account of war conditions.

Short Courses and demonstrations are being held throughout the province at a large number of points, but these are being interfered with to some extent by the influenza epidemic which is serious in many rural districts.

Particular stress is laid on the importance of a good sire in breeding for quality, and an energetic effort is being made to eliminate the scrub sire. There is a considerable feeling that legislation should be utilized to accomplish this purpose now that the scrub stallion has been abolished by legislation and the province turned over exclusively to purebreds. The problem is somewhat different, however, inasmuch as the bull is not so great a communicator as is the stallion.

Under these circumstances legislation has not yet crystallized, but the suggestion is an indication of the strong feeling which exists on the subject in many quarters.

In addition to other methods of impressing the desirability of breeding for quality, live stock clubs are being organized among young people, a Calf



MR. W. BERT ROADHOUSE

Club and a Sheep Club having been started in Peel County, and other clubs being under way in other counties.

FEEDING

Last winter the feeding situation was critical owing to a combination of circumstances. This matter receiv-

ed the attention of the Agricultural Section of the Organization of Resources Committee early in the season. A formula was adopted for concentrated feed for dairy cattle and for swine, to be known as "standard feed." This matter has already been fully outlined in "The Gazette." Steps were taken to secure a considerable quantity of cottonseed meal and oilcake meal from the United States and the Committee was successful in securing permission to import these commodities when such permission was not generally available. As a result of these efforts a large quantity of cottonseed meal and oilcake meal has been brought into the province or is on the way. In the meantime the abundant harvest returns and the termination of hostilities have greatly relieved the situation, and there is not as great likelihood of a shortage as a year ago. Under these circumstances the province will possibly be able to share some of the concentrated feeds brought in with other provinces, but the action of the Committee has effectively safeguarded the Province against any shortage under any circumstances which might have arisen.

MARKETING

Although the question of marketing in its larger aspects of export trade belongs primarily to the Federal

authorities, the Department has been giving considerable attention to the subject of local marketing. Encouragement has been given to the marketing of live stock on the part of Farmers' Clubs and this has been taken up very generally. At the present time a large number of clubs ship cooperatively. During the past year considerably over a million dollars worth of live stock was marketed in this way. The effect is to secure to the producer the largest possible proportion of the market price. The Markets Branch of the Department is continuing to render every assistance so that the business will be established on permanent and safe business lines.

In the working out of all these points, publicity has been utilized by the Department very generally. Considerable space has been utilized in the farm papers and in other publications to place the facts prominently before the breeders and feeders. In the last analysis, the live stock industry depends upon the men on the farm and Ontario is fortunate in having a very large number of men who are very skilful in the production of stock and products of high class quality. Placing the facts of the situation before the people is, under these circumstances, the best service which can be rendered.

MANITOBA

BY W. W. FRASER, LIVE STOCK COMMISSIONER

THE Live Stock situation in the Province is extremely encouraging, particularly does this apply to flesh producing stock.

There has been a substantial increase, as is shown by the following figures:—

	Horses.	Milch Cows.	Other Cattle.	Total Cattle.	Sheep.	Swine.
1913.....	304,088	152,792	256,926	409,718	42,840	184,745
1914.....	316,707	156,306	251,996	408,302	45,303	186,276
1915.....	317,847	157,494	246,603	404,097	50,880	163,308
1916.....	324,175	196,288	357,870	554,158	76,750	205,898
1917.....	324,175	202,177	357,870	560,047	80,588	175,013
1918.....	384,772	225,659	521,240	746,899	136,782	284,596

The receipts at the Winnipeg stock yards show a similar advance as shown from the statement below:—

Total receipts from Jan. 1st to Dec. 19th inclusive, were 267,715 cattle, 12,066 calves, 300,585 hogs and 35,439 sheep, compared with 255,616 cattle, 12,093 calves, 274,365 hogs and 20,373 sheep, received during the corresponding period of 1917.

CATTLE

With a view to increasing the cattle industry and also to helping the struggling settler, our Province first passed an Act, known as "The Settlers' Animal Purchase Act", at the session of the Legislature early in 1916. Under this Act, up to March of this year, about 2,350 cows were distributed to actual settlers, chiefly between Lake Manitoba and Lake Winnipeg. These cows were purchased either with calf at foot or due to calf within a few weeks. Five cows is the maximum number allowed any one family. These cows are purchased by an expert cattle man and are of the dual purpose type chiefly and the best the market offers. At the time above referred to, viz:—March of this year, these cows had to their credit over 4,000 calves. Whereas one butter factory was operating in the districts where these cows have been placed, five are now in operation, two of which are each manufacturing a car load of butter a week. The number of cows put out since March of this year, brings the total up to over 4,000, being an average of about $3\frac{1}{2}$ cows to a family. The moral effect upon these settlers and their families cannot be over estimated, especially when you consider the stimulus given to the industrious farmer in the added prosperity and comforts these cows bring him. Nourishment is provided for the children and the father can stay at home, due to the extra income thus provided, enabling him to cultivate and improve his homestead, whereas otherwise he would have been forced

to go to the City or elsewhere in order to earn money to secure the necessities of life. Now he has the cream for sale and sufficient milk, not only for his family, but to raise the calves and assist in raising pigs. I consider this one of the best and farthest reaching Acts put into force by any Government. This Act renders it possible to overtake labour in the most effective way possible, which otherwise would or could not be utilized, as the children in most of these cases do much of the work and at the same time attend school,



MR. W. W. FRASER

as our School Act requires. A spirit of industry and thrift is produced in the child and a knowledge and often liking for live stock, is gained, which otherwise they would not acquire.

STOCKERS AND FEEDERS

The Department has advanced stockers, both male and female, to farmers, on terms of 25 per cent cash and the balance on the 25th of November following the purchase, for the past two summers.

HEIFER CONSERVATION

Last summer the Department advanced beef type heifers to farmers and ranchers, on a basis of 10 per cent cash and the balance in three equal annual payments, bearing interest at 7 per cent. A large number of heifers of a superior type were distributed to many different points in the Province where there was sufficient feed to warrant the applicants caring for more stock than they already had. These heifers all went out under inspection, either by myself or some competent man, I named.

Under the three different systems above set forth, the Department has this year expended over \$450,000.00. This has done much to stimulate the live stock industry, inasmuch as hundreds of men have purchased car loads of cattle, entirely independent of financial assistance from the Government, whereas in the first instance, in many cases, their interest was aroused by the Government plan. This is borne out by the fact that there have been sent back from the terminal stock yards at Winnipeg, to the three Western Provinces, during the first eleven months of the present year, some 42,000 head of cattle, as against 9,000 in 1913, about 23,000 head of these having been absorbed by Manitoba. It must be remembered at the same time that Saskatchewan and Alberta took back large numbers from Calgary and Edmonton, as well as from our yards.

Now what effect or bearing has this on the pure bred business? We take it that it has the most direct bearing as it will be readily admitted that at least 45 per cent of the 42,000 head of cattle above referred to, are females and of course, require bulls to breed them, thus creating a market for our pure bred sires. Whilst we recognize the good work done on the part of the Federal Department of Agriculture in furnishing a number of bulls and other sires, we feel that in view of the activities above referred to, much greater

expenditure is absolutely necessary in the best interests of the business and the country generally. I am safe in saying that this Department will further extend their efforts and expenditures along the line above indicated. The motto should be (if I am allowed to suggest) "More sires and better sires" and that without undue delay. Now is the time to secure these sires and have them ready for spring delivery. The loss the country annually sustains, between the returns there would be on good cattle instead of the inferior bred cattle referred to, can scarcely be estimated. I think I am not far astray when I say that 75 per cent of the stock coming to the terminal yards, is inferior or only fair grade. The pursuance of the many activities now in operation, as well as individual effort and outlay, will do much to improve conditions. Yet, is this not entirely inadequate to attain in sufficient time the desired result? We think it is. Placing good sires where inferior ones now are, means millions of dollars to the country eventually each year.

Recently an increased number of our farmers are adopting the finishing of good type steers, which means keeping stock in our province that heretofore went east or to the United States feed lot to be finished. This work presents a wonderful opportunity, and we consider it will become a very strong factor in the cattle industry in the near future. Large numbers of these cattle being finished here will increase our revenue enormously, as will be readily seen from the following illustration. viz.:—

Four car loads of good type steers, 2½ years old were bought in the yards here by one of our farmers, at \$8.75 per cwt. the first week in October. These steers weighed about 1,000 lbs. each. They ran loose in a shed (being dehorned) and were each fed from 12 to 15 lbs. of barley chop daily and what hay and straw they

required, having an ample supply of water. In 60 days, when they were brought back to the yards, they had made an average gain of 108 lbs. each and sold at \$12.75 per cwt. making a nett profit, to the owner, after paying all expenses of feed, freight, interest, etc., of \$33 per head.

Summer feeding or grazing of the same class of steer, is showing increased activity each year, as is shown by the above statement of the number of cattle back to the country from the yards here.

SHEEP

The Department has done much in assisting and encouraging the purchase of sheep. Breeding ewes are being purchased for the Boys' and Girls' Clubs. The effect of this will be that sheep will be raised in sections of the Province where heretofore sheep raising was practically unknown. In addition to this work, at least fifteen thousand breeding ewes have been brought in from Alberta this Fall. Good sires have been brought in, in limited numbers and our pure bred flocks are furnishing a large number of very superior rams.

The increase in the sheep industry will be very marked in the near future, as the returns both from the sheep and the wool are very enticing. The adaptability of the country in general, together with the climate, is practically everything that can be desired by those engaged in the production of this class of live stock. We know of no country in the world that is more free from disease amongst sheep than this. The increase of the clip this year over that of last was nearly 75 per cent.

SWINE

The swine industry has been stimulated by the ever increasing prices since the war began. Our hogs show distinctly the attention paid to better breeding and generally they are much better fitted when offered on the market. Much has been accom-

plished through the efforts of the extension work in furnishing pigs to the Boys' and Girls' Clubs, the results being very gratifying. There is much the same experience in hog production as in cattle. We have an ever increasing number of parties purchasing store or stock hogs in the stock yards, and taking them back to the farm or elsewhere and finishing them. So much has this been the case that this class of hog found ready market this year, in the face of high feed and the scarcity of labour. This work is receiving every possible encouragement from this Department.

The railway companies are rendering valuable assistance in stimulating the live stock industry in different ways, such as responding to the requests for fencing their rights-of-way in a suitable manner to turn sheep and swine, when such a fence is made by the farmer on his adjoining land. On application these companies are erecting many local yards at points where heretofore, there were none. Help and the difficulty of procuring material has retarded this work in some instances. More yards will be required with the development of the industry.

The banks are also very materially assisting the said industry, by making substantial advances to farmers and others for the purchase of stock.

HORSES

There has been and is at the present time a demand for good heavy farm and draft horses, when offered in good condition. The demand has been chiefly from Saskatchewan, but we believe there will be an even greater demand in the future, as many horses will be required for bush work in connection with the reviving activities of the lumber business in British Columbia and elsewhere. Manitoba horses are much in favor and command the highest prices wherever used.

Gratifying results have been accomplished by our endeavors to educate purchasers in what might

be termed "Community purchasing", as well as community selling and shipping of live stock. For example a farmer or settler is able to come to the stock yards and purchase a few cattle, sheep or swine, and by one or more of his neighbors joining him, make up a car load. This work is growing and has done much to stimulate production. Heretofore, a

farmer desiring to procure a few more head of cattle, where he had sufficient feed to care for them, was often unable to obtain them locally. Wonderful assistance in this work has been given by the Federal Government providing free transportation on young breeding flesh-producing stock, and paying hotel and railway fare of the farmer coming to the yards.

ALBERTA

BY W. F. STEVENS, LIVE STOCK COMMISSIONER

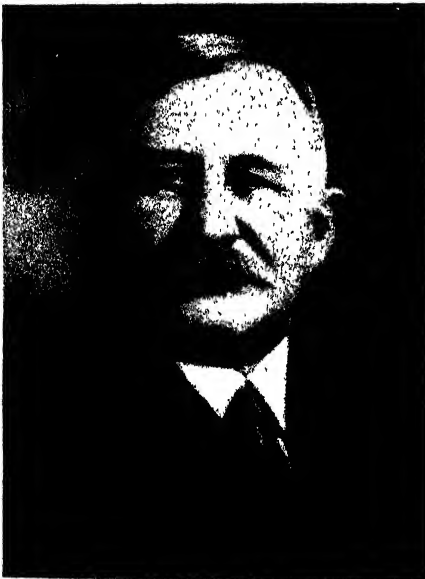
THE activities of the Live Stock Branch of the Alberta Department of Agriculture have been and still are directed along two general lines—educational and direct assistance.

The educational work of this Branch comprises instruction as to the neces-

education. For this reason it emphasizes the advantages to be derived from keeping a flock of sheep on a grain farm in the semi-arid districts, and puts the "soft pedal" on dairying and swine growing. In the long grass country, it directs attention to the importance of dairying and swine growing and says less about wool production. By this means it is able to prevent a waste of energy and loss of time and money that must result from an attempt to pursue a line of production to which a district is not suited. This work is furthered by the agricultural schools, and the short course schools that are put on by the Fairs and Institutes Branch.

Under the heading of direct assistance are included furthering the establishing of open competitive live stock markets; advice and aid in the movement of live stock to these markets; guaranteeing loans to settlers for the purchase of live stock; and the securing of conditions under which stock raising can be carried on more successfully than is possible at the present time.

The Alberta Live Stock Branch believes that just as a keen and healthy appetite depends on the absence of any suggestion of constipation, so a thriving live stock business requires a free and untrammelled marketing system. It believes that unnecessary delays in transit and the absence of competition at marketing centres tend to negative the work of promotion. For this reason it has



MR. W. F. STEVENS

sity of growing live stock of some kind, the class of stock best suited to particular districts, the importance of using good sires and the proper methods of feeding and housing in order to secure the desired results.

This Branch recognizes the futility of a "flat" system of live stock

devoted and still devotes a great deal of attention to assisting shippers in securing a proper service at the hands of transportation companies and it has always identified itself with every movement looking toward the establishment of free and open live stock markets. It does not undertake to ship and sell for the farmer, but it does undertake to assist farmers by suggestion, advice and personal intercession with railway officials in their efforts at shipping and selling for themselves and to protect them against interference on the part of those who are interested in discouraging undertakings of that nature. Under the Live Stock Encouragement Act of Alberta, loans aggregating half a million dollars were made to settlers in 1917 on the guarantee of the province. A similar amount was guaranteed in the year 1918.

With a view to expanding the stock growing business of this province, the Live Stock Branch has, for a number of years, been directing attention to three important facts, namely, the insufficiency of the quarter section farm for mixed farming purposes; the impossibility of marketing farm products at a profit at a greater distance than thirty miles from a line of railway, and the advantages that would result from such an administration of remote areas as would result in specialized and systematic live stock production.

The settler whose operations are restricted to 160 acres can never become a stock grower of consequence because he will need to harvest at least 100 acres of crop each year to maintain his equipment. He will require to summerfallow 40 acres each year and the remaining 20 acres will be needed to supply pasture for his work horses and a family cow. So long as he can pasture a few head of stock on unoccupied land in the vicinity he can get along, but just as soon as this is

taken, he is done so far as stock growing is concerned. If he is able to own a bull at all, it will in most cases be a cheap one, and that means that it will as a rule be either a grade or a scrub pure bred. In either case what little stock he produces is likely to be below par. Hence some system is necessary whereby settlers can acquire at least one half section of land in order that they may be able to maintain enough cows to justify them in purchasing a good bull. When they can do that they can become producers of more live stock and in most cases will become producers of better live stock.

At a conservative estimate there are 50,000 sections of land lying more than 30 miles from a line of railway in northern Alberta yet within the limits of possible live stock production. It will produce on an average at least eight mature cattle per year on each section, which at 25 per cent less than present prices would make a total of thirty million dollars worth of beef per year from lands which now yield practically nothing. There are thousands of small stockmen in the Inter-Mountain states who are eagerly looking for just such propositions. They understand growing live stock under the conditions existing here and have exactly the kind of cattle that are suited to these conditions to stock up with. What they ask for is the use of an area sufficiently large to make possible carrying on operations at long distances from a railway; a tenure to last until transportation facilities are brought within thirty miles of them, and the right to acquire at a fixed price an area sufficiently large to maintain the buildings that they must erect in order to operate as stockmen.

What is wanting is a system permitting the use of what is now going to waste. The Alberta Live Stock Branch is directing attention to the need of such a system.

WINDBREAKS FOR ORCHARDS

NOVA SCOTIA

BY P. J. SHAW, B.A., PROVINCIAL HORTICULTURIST

WE have a good wind-break of Scotch pine on the north and west sides of our orchard at the Agricultural College. This wind-break has only been growing in its present position for four or five years. We think it is useful and worth the expense for the benefit it is to the fruit trees. Last winter all the clover in the orchard was winter-killed except that within two rods of the wind-break. As the trees become taller they will protect a larger area.

In the fruit section of this province it may be a debatable question whether a wind-break for an orchard pays. There are occasions, however, when an effective wind-break would prevent much loss of fruit from high winds in the fruit section. Some fruit growers prefer to plant in large areas and allow one fruit tree to protect another, or to plant

large growing varieties, like Northern Spy, on the outside of their plantation.

In other parts of the province there would be undoubted benefits from planting wind-breaks around orchards. Winds not infrequently sweep over some parts of this province near the sea coast with such force as not only to blow off nearly all the fruit but to break down and uproot the fruit trees. In such cases wind-breaks of native evergreen, such as spruce or even of hardy strong growing deciduous trees, such as maple and birch, would be valuable in protecting the trees and fruit. There are a few parts of the Province in which it is difficult to grow some garden crops on account of the extremely high winds at certain times during the growing season. Wind-breaks are needed there for successful gardening.

QUEBEC

BY REV. FATHER LEOPOLD, O.C.R., PROFESSOR OF HORTICULTURE, OKA AGRICULTURAL INSTITUTE

ANYBODY who gives this subject of orchard protection consideration will find that it is a relatively important one, which is closely related to the subject of the location of a site for fruit-growing.

There is absolutely no doubt that high and strong winds are always to be avoided, if possible, for many reasons: they blow off the fruit either in a mature or immature stage; they injure the trees, especially if thinning has not been thoroughly practised.

On the other hand, high and rolling lands are best suited to most fruits, as winds there find free course, the atmospheric drainage being good, still air is avoided in frosty weather

and there is good natural water drainage. These winds on rolling land are beneficial because they bring in warmer air, and they keep the air in motion in frosty weather. But if these high lands need protection somewhere from strong winds, a wind-break will be beneficial, if it is placed so as not to endanger atmospheric drainage or if it does not expose the trees to suffer from frost.

There is another point that will favour the planting and maintenance of a wind-break, that is, winds, in arid regions especially, abstract a large quantity of moisture from the soil and the plants. This can be diminished to a certain extent by

wind-breaks. In arid or semi-arid countries, and in districts where the soil is light and leachy, but especially where there are large tracts of land whose incoherent soils suffer from the drifting action of the winds, it is important that the velocity of the winds near the ground should be reduced to the minimum.

Here are briefly the reasons which favor a wind-break that does not prevent atmospheric drainage, but breaks the violence of the severe winds:

1. The obvious advantage is in keeping fruit from blowing off.

2. Protects from cold winds, especially in blossoming time. In certain unprotected orchards, a north-west wind will destroy half or more of the crop.

3. Retains snow, and thus greatly protects the trees, which come out much more fresh than those exposed.

4. In summer prevents wind from drying up the fruit, keeping more moisture in the soil and in the leaves of the trees.

5. Protected trees are kept in better shape than the others. The trees become more firmly rooted, are more upright.

6. Trees are less injured during a wind storm, less branches are broken.

Against these advantages which as a whole render the orchard more productive, there are a few reasons that under certain circumstances may prove that wind-breaks are detrimental. But on the whole, one finds that those complaining of losses from cold weather, have gone too far in establishing the wind-break. Either it is a very thick hedge of Norway Spruce or a natural forest that adjoins the orchard.

Fruit immediately adjoining the wind-break is apt to be much injured by insects and diseases, and to be

small and inferior in colour. The trees are less thrifty and there may be greater damage from late frosts in sheltered plantations. But if one follows the following principles, there is no reason to fear loss from a wind-break.

1. If a wind-break stops or deflects a warm wind, it may prove injurious. If there must be a protection, for instance, on the lakeward sides of plantations, let it be simply a wind-break and not a wind-stop.

2. Thorough spraying with modern devices will overcome insects and fungi on trees immediately adjoining a wind-break.

3. If good cultivation is practiced, wind-breaks will not lessen the vigor of one or two adjoining rows, if the wind-break is established only at the planting of the orchard. The older the wind-break, the farther should the fruit trees be from it.

4. In interior localities, far from the water front, establish a denser protection than otherwise. Winds, coming off the land, make a plantation colder. Coarser evergreens, planted close together are advisable for interior places, while deciduous trees, or evergreens more scattered are better for water fronts.

5. Choose for a wind-break trees that are most thrifty and healthy and which are least infested by fungi and insect pests.

6. Norway spruce, Austrian and Scotch pines are the best trees to use among evergreens. Among deciduous trees, I would plant a double, Lombardy poplar on the outside and Norway maple inside, the first planted 20 feet in the rows and the others between each poplar but in a separate row, 10 feet from the row of poplar.

7. Plant the first row of fruit trees at 40 feet from the wind-break.

ONTARIO

BY P. W. HODGETTS, B.S.A., DIRECTOR, FRUIT BRANCH

UNDoubtedly wind-breaks would be an asset in locations where an orchard is much exposed to high winds, but under conditions as usually found in the province, we would hardly encourage their planting. Competent men estimate that wind-breaks should be put from 50 to 200 feet away from the nearest fruit trees which, of course, would be out of the question in the special fruit districts owing to the high price of land.

We find that where evergreen wind-breaks are planted around apple orchards both insect and fungus disease are more difficult to control, and while the answer to this might be that thorough spraying will control all disease no matter under what conditions, we would prefer to have the air and sunlight admitted freely to all parts of the orchard.

Where there are large blocks of land being set out to fruit a row of evergreen or deciduous trees might be advantageously planted across the end of the farm to protect from the prevalent wind, but for the tree fruits we would not consider it good policy to set out an evergreen wind-break around small blocks.

We are speaking, of course, for the commercial fruit districts of the province. For those sections where there is a question as to the hardness of trees and small fruits, the wind-breaks are apparently proving of great value for winter protection. This is something our Department has had very little experience with up to the present time, but with the establishing of an Experimental Station at Fort William, we will carry out experiments that will be of value in future years.

AGRICULTURAL COLLEGE

BY J. W. CROW, B.S.A., PROFESSOR OF HORTICULTURE

IT is unfortunately true that the apple orchards of Ontario are not producing as much fruit as could be desired.

So far as I am aware, however, our fruit trees produce as many blossoms and set as much fruit as formerly, but owing to the greatly increased prevalence of disease and insects, crop yields are undoubtedly reduced.

The question as to the extent to which apple orchards in Ontario should be protected by wind-breaks is an open one, for the reason that the disadvantages incurred sometimes outweigh the advantages gained. The advantages may be listed as follows:—

(1) They reduce the loss occasioned by windfalls.

(2) They hold snow and thereby materially prevent root killing, caused by deep freezing.

(3) They decrease evaporation from the tree in winter. It is under

this head that credit must be given for winter protection, (aside, of course, from the matter of root killing previously mentioned). Tender trees frequently kill back and do so much more seriously when they are exposed to the sweep of winter winds. The actual injury in these cases is explained by plant physiologists as being due to drying out. The stronger the wind the greater will be the evaporation and the more serious the injury. This particular point becomes of great importance in northern horticulture and in this connection it may also be noted that on the prairies or in the north the wind-break functions importantly also as a sunbreak. It is a well known fact that the safest location for a fruit tree on the prairies is on the north side of an east and west wind-break, thereby materially lessening such injuries as sunscald, bark splitting, and the like.

(4) Windbreaks decrease evaporation from both tree and soil in summer and very materially prevent injury by hot drying winds.

(5) Windbreaks raise the maximum day temperature, lengthening the season and thereby insuring the ripening of late maturing varieties.

The disadvantages of windbreaks may be listed as follows:

(1) They occupy space. Many fruit growers feel that it is more profitable to give the ground to one or two rows of fruit trees of sorts which can endure exposure to wind. Cherries are frequently planted to windward and such apples as Snow and Spy are likewise well suited to such locations, because they hang well to the tree and do not blow off. Another reason for planting these two varieties in such a situation comes under the following head:

(2) Windbreaks materially increase the damage caused by apple scab and frequently render control measures extremely difficult.

(3) Windbreaks harbour insect pests.

(4) Windbreaks rob trees of moisture and food. This point may be guarded against by cultivating the windbreaks and applying manure so as to keep the roots "at home" and prevent them extending to the tree area, which they are frequently compelled to do by impoverishment.

(5) Windbreaks lower the night temperature in their immediate vicinity and on the leeward side. It is for this reason that fruit growers sometimes charge windbreaks with causing frosts. Any one who has observed the occurrence of frosts will know that they are much more common and much more serious when or where the air is still. Windbreaks cause frosts directly by checking the slight movements of air so earnestly desired by the fruit grower on

cool nights and this detrimental effect should always be borne in mind in choosing a location for the shelter planting. It should, if possible, be so situated that the air on the protected side will drain away on still nights instead of banking-up to form a frost pocket.

(6) Windbreaks increase the daily range of temperature by raising the maximum in daytime and lowering the minimum at night. This extended range of temperature frequently results in damage, such as bark splitting, for the reason that these injuries are caused by the contraction of the trunk which accompanies a sudden drop in temperature.

It is, of course, obvious that the influence of the windbreak decreases directly with distance. It is not likely the effect would be appreciable at a point farther way than a distance of ten or twelve times the height of the trees, on the level.

Windbreak planting, when required in Ontario, should be located on the southwest and west sides of the orchard. If the most effective windbreak is desired the best tree is probably Norway Spruce, although White Pine grows taller and is much longer lived. A double row of Norway Spruce planted at ten foot distances, the second row alternating with the first, would make a most effective windbreak.

If it is desired only to check the force of the wind and not break it entirely a deciduous planting such as maple or ash would be satisfactory. Lombardy Poplar also makes a very desirable windbreak, as the tree is both tall and narrow. I do not think it would be necessary to allow any more space between the windbreak and the first row of orchard trees than would be sufficient to permit of cultivating and spraying when both are fully grown. This is a matter which can be easily determined for any given case.

HORTICULTURAL EXPERIMENT STATION, VINELAND

BY E. F. PALMER, DIRECTOR

WHILE we have conducted no experiments to prove the value of windbreaks for orchards I shall give my personal views of their usefulness based on observation and experience.

There are many orchards in Ontario which would undoubtedly be greatly benefitted by a good windbreak properly situated as windbreaks have certainly many advantages. Some of these are the shelter afforded for orchard operations, particularly pruning and spraying; better conditions for pollination at blossoming time as strong or cold winds discourage insects working and are also unsuitable to wind pollination; fewer windfalls from strong winds or gales; extremely cold or extremely warm winds are checked and therefore do not do the same amount of harm.

Prevailing winds in Ontario are from the southwest and windbreaks would therefore be of most service in that direction. In the Niagara Peninsula, however, or in fruit sections similarly located, it is possible that cold winds off the lake during blossoming period reduce the crop considerably. It has been observed

that a whole orchard may have a good set of fruit on the southeast side of the tree, whereas the northwest side had practically nothing.

Many species of trees have been found suitable for windbreaks. For Ontario conditions, possibly Norway Spruce is as good as any as it affords protection the year round.

The windbreak should be well kept back from the orchard being at least fifty feet from the first row of apple trees and preferably from two hundred to three hundred feet.

With special reference to windbreaks, in Manitoba and Ontario, I do not consider the conditions as at all comparable. In the prairies, winds during the winter are very cold and very dry and I am of the opinion that it is the factor of dryness in these winds that causes the greatest loss in trees and in fruit buds. Our winds in Ontario are normally neither so cold nor so dry as in the west and therefore I think that while windbreaks have many advantages for us also, yet we do not need to plant them for the same purpose, as they do on the prairies as noted above.

BRITISH COLUMBIA

BY BEN HOY, B.S.A., ASSISTANT HORTICULTURIST AND INSPECTOR OF FRUIT PESTS

WINDBREAKS are not used to as large extent in British Columbia as the benefits derived from them in many districts warrant. Some of the chief benefits from windbreaks are as follows:—

I. Protection by checking the mechanical force of the wind and preventing trees heavily loaded with fruit from breaking.

II. In windy sections where the soil is fine the drifting of the topsoil and dust storms are greatly reduced.

III. They make the orchard a more desirable place to work. Pruning on a cold raw windy day can be done more comfortably in a sheltered orchard. Spraying can be carried out more successfully in an orchard free from heavy wind. Men can work more days in the year in protected orchards than in unprotected ones.

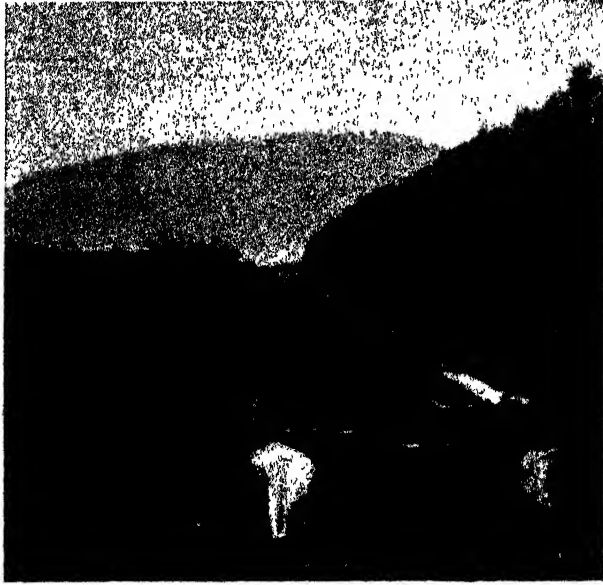
IV. Checking the wind checks evaporation. This factor is very important in districts of light rainfall.

V. Windbreaks are an excellent protection against winter killing.

It is a noticeable fact that on a windy exposed area we find more winter killing than on protected areas.

Many object to windbreaks for their orchards on the ground that they rob the soil and waste too

those who have never tried them. The men who have well grown windbreaks in nearly every case consider the windbreaks one of their greatest assets. The added danger from frost is more apparent than real. It is



ROW OF LOMBARDY POPLARS ON RIGHT PROTECTING THE ORCHARD ON LEFT IN BRITISH COLUMBIA

much land, that they make conditions for frost injury at blossoming time more favourable by preventing the movement of air. The men who object to windbreaks are usually

only on still nights when there is no wind that frost occurs and a windbreak can make no difference on such nights.

LIVE STOCK COMMISSIONER GOES TO ENGLAND

Just as this number was going to press Mr. H. S. Arkell, Live Stock Commissioner, was dispatched to England by the Hon. Mr. Crerar in connection with the situation that has developed affecting the export of meats and other animal products from this country. Mr. Arkell being fully acquainted with the live stock situation in Canada will be able to greatly assist overseas representatives of Canada in London in securing an early renewal of the export movement of bacon and other animal products from Canada which has been brought to a temporary cessation owing to the extraordinary situation that has arisen through the unexpectedly sudden termination of hostilities.

NEW BRUNSWICK

DEMONSTRATION PIG PASTURES

BY O. C. HICKS, B.S.A., INSTRUCTOR IN SOILS AND CROPS

THE introduction of pig pastures during the season of 1918 as a special Production Effort to aid in the production of pork was carried on through a plan of co-operative grazing tests with stock-farmers in the various counties of the province.

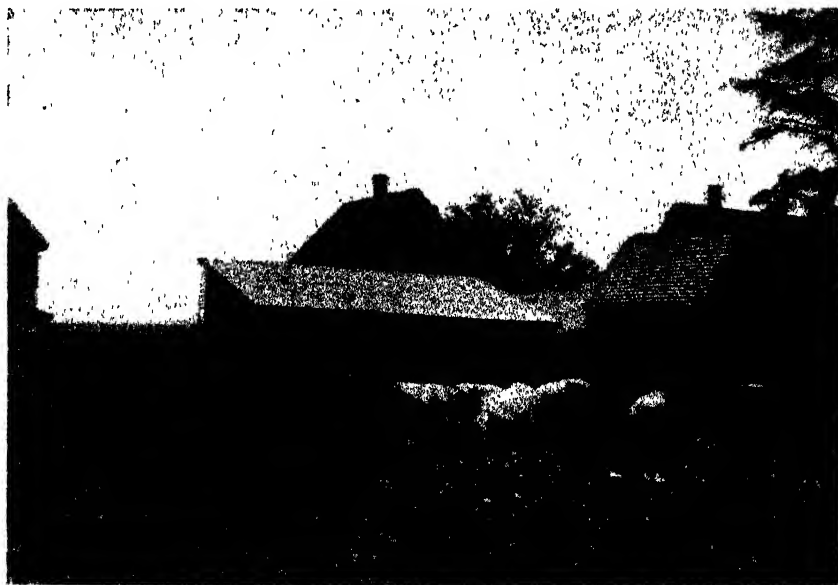
Forty-eight demonstration pastures were provided for in thirteen counties and two hundred and forty-five pigs were grazed.

(d) Grain mixture. Oats $2\frac{1}{2}$ bushels and peas $1\frac{1}{2}$ bushels.

(e) Grain mixture. Oats $1\frac{1}{2}$ bushels, peas 1 bushel and barley $1\frac{1}{2}$ bushel.

Mixed clover and timothy seed was furnished to seed down all grain pastures so that the area could be used as a pig pasture the following spring.

Each of the forage crops tested made good pasture for a part of the summer. Red clover proved the



HOG PASTURE OF RAPE AND VETCHES, NEW BRUNSWICK

Each experimenter received free a quantity of seed sufficient to sow one acre of ground and a coil of woven hog fence wire with which to enclose the pigs.

The following forage crops were tested:—

(a) Rape, 5 lbs. sown in rows 26 inches apart.

(b) Red Clover, a year-old stand used as pasture.

(c) Grain mixture. Oats 2 bushels and barley $1\frac{1}{2}$ bushels.

most satisfactory crop under the conditions of the test. Pasturing on clover may begin before the blossoms form and continue all summer if a rotation of plots is provided and the area not overstocked.

The results of the test this year indicate that grazing will prove an economical method of feeding and growing pigs.

The test will be continued this year on the same number of farms.

QUEBEC

THE OKA AGRICULTURAL INSTITUTE

TWO YEARS OF SUCCESS WITH DUSTING

BY PROFESSOR J. R. COSSETTE, B.S.A.,

DUSTING has now been carried on for two years in the orchard of the Institute, and it may be called a success. But will dusting ever go so far as to take the place of spraying with lime-sulphur wash, which has given such beneficial results? It has not been possible to make a co-operative record of experiments carried so far in the various parts of the province, and it is only by comparing results that a decision may be reached as to the merits of the two methods: liquid spraying and dusting.

Both methods have their advantages which cannot be denied, and both have also their weak points. They are more or less easy of application when the temperature is favourable, and there are other well-known objections, and especially that of being somewhat expensive. This will always be a serious objection for a great many people, who do not hold the same views on orchard economy. To spend as little as possible on the care of the orchard and make as large a profit as possible, such is the ideal of the greater number, and it will be difficult to change the mentality of those people, at least in a general way.

To be admitted by all, results should be quite obvious, and it is with a view to help in this demonstration that dusting was used again this year for the protection of the orchard at the Oka Institute.

The results of the experiments this year were as follows:—

The number of apple trees sprayed was 1,407, 1,300 of which were trees in full bearing, and 107 younger trees. The quantity of mixed powder used was 8,020 pounds, and four dustings were given.

The first from May 20 to 23 inclusive, required 2,360 pounds (944 lbs. of sulphur and 1,416 of talcum).

The second, from May 29 to June 4 inclusive, required 2,990 lbs. (299 of L.A., 1,196 of sul., 1,495 of talcum).

The third, June 10 (7-30), required 1,240 lbs. (496 of sulphur and 744 of talcum).

The fourth, from June 15 to 19, required 1,430 lbs. (143 of L. A., 572 of sulphur and 715 of talcum).

The purpose of the latter was specially to control the bud worm.

The result was that 99 per cent of the apples from dusted trees were exempt from scab and worm-holes.

This result shows at least that powder might with advantage take the place of the lime-sulphur wash, which gave the same result during the past years, but which is not so easy to apply as the dust and which costs more. This success, is not however, as conclusive as desired, owing to the fact that the orchard was almost decimated last year by the severe and continued cold which caused such tremendous havoc in certain parts of the province. However there does not appear to be any reasons why the same satisfactory results should not have been obtained on the trees that were killed by the frost, and it may be said that the dusting was really useful and satisfactory.

The efficiency of dusting showed up specially when the hideous disease called canker, appeared towards the end of July and proved irresistible. What would the lime sulphur wash have done? Would it have checked this infection? It is believed that this canker is of German origin and consequently its control requires an allied combination, of the most powerful means.

This opens the way to new experiments, which will certainly be carried on. The powders used in dusting are, lead arsenate, sulphur and talcum; the proportions in which these various ingredients are mixed, have already been given. The application of the mixture required 55 hours; a quantity of one hundred and forty-six (146) pounds was dusted in one hour.

The following quantities were required for dusting 1,400 apple trees: 4,370 pounds of talcum, 3,208 pounds of sulphur and 442 pounds of lead arsenate. The talcum is worth \$20 per ton; the lead arsenate \$45 per hundred pounds and the sulphur \$3.50 per hundred pounds, which makes the cost of dusting 28 cents per tree, in addition to the cost of labour and time. Of course, this method of protection is rather expensive and this is the greatest and the chief obstacle in the way of its general adoption, especially if the results are not quite conclusive.

It has been decided to continue dusting at the Institute. The havoc caused by the frost has made a number of orchardists, who had followed the work of last year, with great interest, lose all their interest in the proceedings. The diseases which dusting as well as spraying were called upon to control have become for them of secondary importance. The great question now is to reconstruct the orchards that have suffered to such a large extent from the hardships of last winter.

And the question is important enough. How many people there are for whom the orchard is the main source of revenue! The losses are incalculable and they will be felt for many years until the winter apple orchards are completely reconstructed, as the winter apples are the ones that have suffered most.

The orchards of the Institute have not been spared. Among the Ben

Davis, 144 trees were killed; among the Fameuses, 20 were killed, 15 are seriously ill and 75 have little hope of living. Among the McIntosh, 28 were killed. The Pewaukee and Russet are decimated and the rest will only slowly and painfully come back to life. Over 70 Wealthy have perished and at least 30 are more than damaged. Many St. Lawrence and Alexander have fallen. About 700 apple trees, all told, show their branches stripped of leaves.

The Hyslop, Scott Winter and Salome are the only ones left in full possession of their strength.

Many of the pear trees have also died, as well as some of the cherry trees and prune trees. No fungus disease has as yet caused such tremendous ravage, and it was the same throughout all the district. The losses caused amount to thousands of dollars.

It is evident that the situation last spring, was not very favourable for spraying experiments. It is quite certain that the work of this year cannot be used as a basis to calculate the cost of dusting. With the same quantity of mixture a much larger number of trees might have been dusted.

The dusting had no effect whatsoever on canker. Of course, it was too late then to try the lime sulphur wash, but after the failure of the dust, which contains almost 50 per cent of sulphur, it is a question if a fungicide of this nature can really be efficient to control canker. The sulphur which forms almost one-half of this mixture has probably no value in this connection.

It is evident that another mixture must be found to deal with this parasite that has just invaded the orchards. The varieties which have been specially attacked by the canker are the Duchess, Alexander and Wealthy.

ONTARIO

NURSERY INSPECTION

THREE years ago it was found that San Jose scale was beginning to get very plentiful in an occasional nursery in Ontario. After searching for the cause it was discovered that the men who were doing the budding were unconsciously inserting the scale with the buds into the nursery stock. Instructions were then given to the inspectors to examine all bud stocks and destroy all found with scale on them. The nurserymen were also urged to spray their nurseries. The result has been that San Jose scale in the nurseries has been decreasing until last year the inspectors scarcely found scale

in the nurseries at all, and this has saved thousands of dollars worth of nursery stock which otherwise would have been destroyed. Some time was also spent by the inspectors under the Fruit Pest Act, in the winter of 1917 and 1918, inspecting in the principal towns and cities for Tussock Moth, which was found very bad in cities bordering on the lakes. In such cases the Mayor and Park Superintendent were consulted and given instructions how to destroy the egg clusters with the result that the Tussock Moth has practically disappeared for the present.

MANITOBA

GRADING UP A FARM FLOCK OF MONGREL HENS

BY M. C. HERNER, B.S.A., PROFESSOR OF POULTRY HUSBANDRY, MANITOBA AGRICULTURAL COLLEGE

MANY of the farm flocks are only a lot of mongrel hens kept for the sole purpose of supplying the table with fresh eggs during the spring and summer months, and to furnish a few chicken or fowl for table use in the fall. Beyond this nothing more seems to be expected. The question of whether they pay seems unimportant, and yet such a flock will eat more and lay less than a flock of pure-bred or grade birds bred specially for more eggs, greater size, and better colour. Besides this, a flock of pure-breds, or even grades, will look far better.

A flock of hens of all sizes, shapes, and colours cannot, and will not, do as well as a flock of uniform hens. The nature and requirement of the

individual birds without any breeding back of them, vary so much in mongrels that it is impossible to get the returns that a more uniform and better bred flock will give, both in eggs and meat.

The owner of a flock of mongrels may be rather sceptical about this statement, but probably one year's use of pure-bred males with the mongrel females will show sufficient contrast to convince him.

METHODS OF IMPROVEMENT

The method of improving the mongrel flock appeals more to the average farmer than any other, since it means only a small outlay each year for a few pure-bred cockerels:

The mongrel females crossed with these roosters will throw something pretty good in the way of uniform size, shape, and colour. Using the improved pullets from the mongrel pure-bred cross, and in turn mating them with pure-bred cockerels of the same breed as those used the past year, the second step in improving the farm flock will be taken. Following out this method for five years will establish a flock of chickens that will nearly, if not fully, equal a flock of pure-bred birds in egg production, as well as meat producing qualities. From a straight utility standpoint they would compare very

be accomplished by working out a practical problem like this, and its probable effect on the grading up of the farm flocks throughout the country, the Poultry Department of the Manitoba Agricultural College has started work in grading up a flock of mongrels. A year ago last October, 100 mongrel pullets were put in one of the farm poultry houses on the plant. They were secured through local dealers who had them sent in from many different points.

In size, shape, and colour they were about as mixed, or nondescript, a lot of chickens as we could get together. There were pullets in the flock



ORIGINAL MONGREL FLOCK OF 1917.
FROM POULTRY HOUSE B., MANITOBA AGRICULTURAL COLLEGE

favourably with a flock of pure-breds. In colour, however, they could scarcely come up to them.

Probably if the average farmer were fully aware of what he could accomplish by the use of pure-bred males, he would be pretty quick to switch over. The fact that he has been slow to do so would indicate that he has yet to be "shown how".

EXPERIMENTS AT THE COLLEGE

Having this in mind, and also the immense amount of good that could

bearing slight resemblances to every recognized breed and variety in the poultry world, and yet not a single one was a pure-bred. There were birds with crests, "top knots", and beards. Some had red lobes, others white, and others again a combination of the two. Some had clean legs and others feathered, and so on; in fact a look at the flock would bring to mind the famous "57 varieties".

This flock was mated with six yearling Barred Rock cocks of our heavy laying strain. Two lots of eggs were hatched, which furnished

enough pullets for this year's work, and quite a large number of cockerels, which are being finished for market. The photographs of the original flock and those of the pullets furnish sufficient material for comparison at this time.

DURATION OF THE EXPERIMENTS

The plan is to carry on the experiment or demonstration over a period of five years. Everything is operated on a straight farm basis. The house, its fittings, the yards and the fencing are of the simplest and cheapest kind consistent with durability. The feeds used are also

year, and will also enable us to compare pullets with pullets. In the future we intend to follow this plan in order to have conditions as uniform as possible from year to year.

RESULTS AND PROGRESS

What has been accomplished in the first year's work in the way of getting uniformity in size, shape and colour forms the most striking object lesson on our plant right now. What has been accomplished in the way of increasing the egg production remains yet to be seen. That there is room for improving or increasing it is evident by the following figures.



1918 PULLETS FROM MONGREL BARRED ROCK CROSS FROM POULTRY HOUSE B.,
MANITOBA AGRICULTURE COLLEGE

straight farm rations. Everything is the same as the farmer would have.

Owing to the heavy mortality early last fall and a number of deaths during the year there were 72 hens carried through for the year. This has made a slight change necessary in our original plans. Instead of carrying over 50 of the best layers from yearlings to two-year olds, and adding pullets sufficient to make the flock 100 strong, we have killed off all the yearlings and are using only pullets this year. There are 75 of them, which makes the size of the flock about the same as last

The total number of eggs laid for the year beginning October 14, 1917, and ending October 13, 1918, was 513 dozen, or an average of 70 eggs per hen. Deducting the number of eggs laid by the hens that died during the year, the average is brought up to 78 eggs per hen. The following is the amount of food fed and the cost of it:

Hard grain, 3,887 lb. at 3c.	\$116 61
Dry mash, 2,100 lb. at 2c.	42 00
Buttermilk, 4,700 lb. at 25c. per 100 ..	11 75
Grit and shell, 125 lb. at 1c.	1 25
Wet mash, 408 lb. at 2c.	8 16

Total..... \$179 77

Figuring the feed at these prices, the cost of the eggs is a fraction over 35 cents a dozen. Since all the birds were trap-nested it was possible to get individual records of each hen. The best one in the flock laid 123 and the poorest laid 3 eggs. There were only 10 in the whole flock that laid over 100 in the year.

THE KEEPING OF RECORDS

In order to maintain uniformity in the system of care and management of the flock the keeping of records and so on various comments on the work thus far might be made, but the actual appearance and performance of the birds as individuals and as a flock as a whole is probably the best indication of the real value of

the work. We believe that from a straight farmer's point of view, and also from the standpoint of the breeder, the demonstration carries with it an object lesson of real practical value to every poultry raiser, and of benefit to the industry as a whole. As far as we are aware it is the only experiment of its kind conducted with a full sized farm flock, and carried on under actual farm conditions. The direction of the work and the choice of breeds in the grading-up work has been largely a personal matter. The results obtained will determine the continuation of the work with other mongrel flocks and males of other breeds after the experiment is concluded.

PLAN TO IMPROVE HORSE STOCK

THE Manitoba Department of Agriculture is making arrangements to assist horse breeders in the province to secure the use of improved stallions. Horse breeding having reached a low ebb intervention on the part of the Department appeared necessary to prevent further serious deterioration in the horse stock of the province. The Department of Agriculture is arranging to purchase, wherever it is necessary to go for them, high-class stallions of the draught breeds, to be sold to farmers at actual cost. As an initial step a survey of the province

is being made with a view to ascertaining the requirements. Farmers desiring to go into horse raising are expected to supply full particulars as to the kind of stallions required and the number of such horses needed. The horses will be selected and purchased by competent horsemen in Eastern Canada and the United States. They will then be brought to Winnipeg and distributed to the purchasers who will pay cash covering merely the cost of the animals plus administrative expenses.

ELECTRICAL TREATMENT OF SEED

BY S. C. LEE, M.A., PROFESSOR OF PHYSICS, MANITOBA AGRICULTURAL COLLEGE.

THE urgent need for increased production of food stuffs during the past two years has led to renewed activity in research along this direction. Among other lines the application of electricity as a source of stimulant for increasing crop yields has been receiving considerable attention, and apparently with more or less varied success.

With a view of narrowing down the field of investigation to a point where further research might prove more effective, the Physics Department of Manitoba Agricultural College carried through over one hundred laboratory tests during the midsummer months. This work is being continued, and arrangements completed whereby the results, which

seemed to offer the greatest inducement for practical application may be tried on an acreage scale under normal field conditions during the coming season.

Up to the present time investigational work in electroculture has fallen into two distinct divisions, viz.: (1) The application to field crops of the overhead electric discharge from high tension wires, and (2) the electrical treatment of seed before sowing.

Briefly described the overhead discharge is carried out through a network of wires strung above the crop plot. These wires carry high voltage electric charges which are silently discharged at intervals through the growing crop to the soil beneath. In some cases the experimenters have also placed a corresponding network of wires in the ground beneath, before sowing the crop, and in this way facilitated the electric discharge as well as localized its action.

From the overhead discharge very encouraging results have been obtained on small plots, not only in England and on the Continent, but also by some American investigators. The difficulty and expense of carrying this to an extent to which it could be profitably applied to large areas of cultivation such as concern our Western farmers is at once evident, and hence any general application of this method is at present out of the question.

It was for this reason that the second division, viz. the electric treatment of seed was chosen as the basis of investigation; since there seemed very little difficulty in the way of applying the process, if successful, even to large acreages. The method employed was to place the seed in a solution, and subject the solution with the seed immersed to an electric current.

It requires only a casual glance at the varying factors which may enter into this process, in order to appreciate the difficulties that arise

in narrowing the results down to a sphere where time can be most profitably spent. For example, there arises the question as to effect of direct or alternating current, high or low voltages, strong or weak currents, varying temperatures, varying solutions as well as varied strength of the same solution, length of time of treatment, and finally the effect produced on different kinds of seed.

So far experiments here have been limited to wheat seed only. For immersing solution the following have been tried: tap water, copper sulphate, calcium chloride, sodium chloride and dilute sulphuric acid. The copper sulphate, calcium chloride and sodium chloride were made up in three different strengths of solution, roughly speaking dilute, concentrated and saturated.

Both alternating and direct currents have been used. In the alternating current three voltages were tested out, viz.: 25 volts, 110 volts and 250,000 volts (approximately). With direct current two voltages only were employed, one 25 volts and the other 100 volts. The strength of electric current under investigation varied from less than 1 ampere up to slightly over 10 amperes in both direct and alternating types. Controls of untreated seed under similar conditions were used in all experiments.

The object aimed at in this investigation is twofold, (1) To ascertain if any phase of this electrical treatment of the seed will produce an earlier germination, and (2) to determine if such treatment will give rise to any increased yields. This latter question cannot well be solved by laboratory experiments, and hence must be relegated to field tests. Should either or both of these results be obtained to any marked degree steps should be taken to work out a feasible system for treating seed in bulk at local centres. It is even possible that individual outfits might be devised that would enable the farmer to process his own seed at no greater

trouble or expense than is involved in the bluestone or formalin treatment so generally in vogue at present.

It is too early at this stage of investigation to make any definite pronouncement with regard to final

results, but it is hoped that before the end of another year some more specific data may be available for publication. In the meantime correspondence is cordially invited concerning any phase of the work.

SASKATCHEWAN

ROAD DRAG COMPETITION AWARDS

AWARDS in the Road Drag Competition carried on by the Department of Highways of the Province of Saskatchewan in 1918, have been announced. This competition, which has been carried on for several years, was open to the councils of organized rural municipalities, duly affiliated automobile clubs and duly organized good road associations in the province. Each road entered was required to be at least two and not more than six miles long. The rules governing the

competition were published in the April Gazette last year. Five prizes were offered in each of six districts, aggregating \$500. Three grand prizes were also offered, open to the whole province. These aggregated \$500. In the competition there were sixty-six entries, as compared with forty-four in 1917. The rural municipality of Marriott won the first grand prize for the second year in succession. An automobile club and a good roads association each won awards.

BRITISH COLUMBIA

THE CONTROL OF TUBERCULOSIS

BY A. KNIGHT, V.S., CHIEF VETERINARY INSPECTOR.

BY the Contagious Diseases Act of 1911 and the subsequent amendment thereto.

"All cows shall be subject to the tuberculin test at least once every year, and more often if so directed by the Lieutenant-Governor in Council, and no milk shall be taken for use from any cow suffering from disease."

"All cattle imported into British Columbia for dairy purposes shall be subjected to the tuberculin test three months after their admission to the Province, or as soon thereafter as practicable."

"Any person, who, either by himself or with the aid of or on behalf of any other person, shall inject any tuberculin or other substance into any part of the body of any animal for the purpose of preventing reaction to the application of the tuberculin test as made by any Inspector under this Act shall, in respect to each animal so treated, be guilty of an offence under this Act."

Prior to 1913 considerable tuberculin testing had been done by the

subcutaneous method in British Columbia. This testing was carried out free of charge by the Department of Agriculture, but no compensation was allowed until the year 1910. In all cases no testing was carried out only by request of stock owners.

Commencing in 1913 we adopted the intradermal tuberculin test, which has proved entirely satisfactory. This test has proven fully as accurate as the subcutaneous method. We are highly pleased with the results obtained.

During 1913 a farm to farm visit was made by our veterinary inspectors, and the cattle submitted to the test. The same method has been adopted up to the present time. The percentage of reactors in 1913 was $8\frac{1}{2}$ per cent. At the present time it is running around

3 per cent. Some herds at the commencement of our work were showing 30 per cent of reactors. The owners of these herds made applications to have the herds retested at least every six months and to-day with the exception of one or two herds no reactors have been found for the past three years. We have had the fullest co-operation from the owners of pure bred herds, in fact, I may state that it was through the owners of pure bred herds that we were largely instrumental in securing the passage of the B.C. Act governing tuberculosis which made it compulsory, and our pure bred dairy herds almost without exception can show a clean bill of health.

One feature of the work is that post-mortems are held on fully 95 per cent of the reactors. The owners in all cases are invited to attend these post-mortems. When finding reactors in a herd the owner has the option of placing these animals strictly in quarantine, or having them destroyed. The inspector has to be satisfied with the quarters assigned to the animal, and no milk is allowed to be sold.

The milk, if sterilized, can be fed to fattening calves or swine on the premises. Also any calves, if born, if taken away immediately, may be raised.

COMPENSATION

The owner of reacting animals is allowed 50 per cent of the valuation. A limit of \$100, however, is put on the valuation of grade animals and \$200 on pure bred. The animals are valued at time of slaughter. Should the carcass be considered fit for human consumption the owner is paid the beef value direct by the butcher. Should the beef value not come up to the compensation allowed by the Government the difference is made up in compensation. Should the beef valuation amount to more than 50 per cent of the valuation the owner is allowed to retain the full beef value. A certificate of cleansing of the premises has to be handed into the Department before compensation is allowed.

The results of our efforts are proving satisfactory to the Department, and we trust in a year or two to reduce our percentage of reactors.

FEDERAL REGULATIONS.

BY F. TORRANCE, B.A., D.V.S., VETERINARY DIRECTOR GENERAL.

IN consideration of the progress which had been made by the Province of British Columbia in the suppression of bovine tuberculosis, and in response to their request the following regulation under the federal Animal Contagious Diseases Act was passed and has been in force since December 10th, 1912:—

"Sec. 82½. No common carrier shall receive for shipment or carry into the Province of British Columbia, any registered pure bred cattle, unless the same are accompanied by a certificate signed by an inspector setting forth that within thirty days prior to the date of shipment they have been submitted to and have passed the tuberculin test."

Under this regulation the officers of the Health of Animals Branch have tested large numbers of cattle which have been destined for British Columbia from other parts of Canada, and the regulation has been carried out without objection on the part of shippers or others.

It will be noticed that the regulation applies only to registered pure bred cattle, and so far as other cattle are concerned there is no impediment to their free movement regardless of their freedom from tuberculosis or otherwise.

STALLION ENROLMENT

STALLION enrolment is regulated by statute in every province in Canada except Quebec. The Act in New Brunswick came into force last year. The enrolments are reported as purebreds, and grades without regard to the particular breeds. The following table is made up from returns supplied by the different provincial departments of agriculture.

Pure Breeds	P.E.I.	N.S.	N.B.	Ont.	Man.	Sask.	Alta.	B.C.
Clydesdale	16	34		885	460	1,357	1,006	41
Percheron	3	12		262	169	717	907	15
Shires				33	13	35	78	2
Suffolk				3	6	20	40	3
Belgian				11	27	136	124	3
French Draft								5
French Canadian				7	2		1	
Standard Bred.	23	34		248	24	67	78	6
Thoroughbred				25		8	21	6
Hackney		3		49	19	22	14	8
French Coach	1	1		3	4	3	3	2
German Coach				5	3	1		
Saddle Horse						1		
American Trotting								4
Morgans								
Irish Hunter						1		
Ponies and Morgans.				4	1	1		
Jacks						2		
Totals	43	84	109	1,535	728	2,371	2,272	95
Grades	27	44	110	458		635	1,100	19
Scrubs		62				14		
Total number of horses enrolled in each province	70	*190		1,993	728	3,020	3,372	114

*Professor Cumming in supplying the numbers for Nova Scotia, explains that the reduction in number from those of 1917 is due to the ascertained fact that horse breeding has dropped to a very low level in the province.

Mr. G. H. Hutton, B.S.A., who for a number of years has been Superintendent of the Dominion Experimental Station at Lacombe, Alta., has resigned his office to succeed Dr. J. G. Rutherford as Superintendent of Agriculture and Animal Industry in the Department of Natural Resources of the Canadian Pacific Railway Company with headquarters at Calgary. Mr. Hutton in his new position will have the direction of the demonstration and supply farms of the Canadian Pacific Railway Company in Alberta and Saskatchewan. Mr. Hutton is a graduate of the Ontario Agricultural College.

PART III

Junior Agriculture

DEMONSTRATIONS, COMPETITIONS, AND CLASS-ROOM STUDIES IN RURAL LIFE FOR BOYS AND GIRLS

NEW BRUNSWICK

NATURE STUDY

BY R. P. STEEVES, M.A., DIRECTOR, ELEMENTARY AGRICULTURAL EDUCATION

THE study of Nature in school through the material supplied from its environment opens an avenue in the early grades whereby pupils are by good methods put on the right track to obtain a good education. To get the best results, interest and purposeful effort are necessary. We hear a good deal, not so much as formerly, about the value of discipline of obedience, forced if need be, all of which is very good as far as it goes. The one great difficulty is that if relied upon and carried far, it depopulates our schools before real education is imparted. Many people in mature life have been heard to say "Had I been shown the purpose for which I was at school, I should not have left it so soon."

Through Nature Study in the early grades, interest is fostered, attention riveted, the desire to know is strengthened, and willing effort grown, while all the time opportunity for discipline of the severe controlling kind is amply afforded.

Children have through their own unaided powers some general knowledge of environment, and this knowledge wisely used forms a ground work on which to build. Not only is a large fund of valuable information the result, but the training and discipline from inter-

ested application is of far reaching value in the education of the child. Then, too, is there given by such Nature Study instruction during the early susceptible years of child life, a bent of mind appreciative of the natural conditions of our country and accustomed to utilize them for intellectual values.

Again we must re-state that the study of language about Nature is no substitute for the real thing. It lacks the vital spark and disinclines to application, as any counterfeit might be expected to break down.

Objects can best be studied in their natural habitat. Here they have a meaning; and hence it is important that outdoor application should precede instruction in class room. Whether the subject taught be insects or birds, plants or fish, natural phenomena, minerals or trees, the pupil for whose benefit the exercise is given must always be the active, not the passive, agent.

As history cannot be intelligently taught without composition, literature, writing, and geography, both as aids and as by products, so with Nature Study, an intimate interlocking with composition, literature, geography, spelling, writing, drawing, and arithmetic is not only desirable, but absolutely necessary.

ONTARIO

PEEL COUNTY

THE CALEDON SHEEP CLUB

BY J. W. STARK, B.S.A., AGRICULTURAL REPRESENTATIVE

FOURTEEN boys and girls in Caledon Township, Peel County, made a beginning in sheep raising when they received two pure bred Oxford ewes each through the Caledon Sheep Club, which was organized by the Agricultural Representative. The distribution took place at Caledon on December 21st and was the first event of this kind in Ontario, and one that will not be soon forgotten by the young members as they proudly drove off with their much prized sheep. Both shearling and two shear ewes were in the lot and were paired off and numbered, each boy and girl drawing a number from a hat. They were allowed to pay cash if they wished or they could give a note for ten months endorsed by parent and bearing interest at six per cent per annum. Fifty dollars each was the price paid, six members giving their note and eight paying cash. Although it was announced in the rules of the club that the ewes would be insured against death for one half the original cost by means of an assessment, the members by unanimous vote decided to each bear his own risk of loss.

An agreement as shown below was signed by member and parent. It is intended to make the club as educational as possible and each member's name is being put on the mailing lists of the Dominion and Ontario Departments of Agriculture. In addition the boys and girls will be visited from time to time and assistance will be given if necessary in feeding and management and in marketing the wool and lambs. The ewes are at present in lamb to either imported or first

class Canadian bred registered Oxford rams and next fall it is hoped to secure the service of an outstanding sire and have all the ewes brought to a central point to be bred. This will not only assure good stock but will tend to uniformity of type.

An arrangement was made whereby the financing was done by the Sterling Bank at Orangeville and the manager was present when the sheep were given out to take care of the payments. The bank took a keen interest in the club and assisted with the advertising, etc. We have found all the banks eager to help with this work and there is no reason why Farmer's Clubs and other agricultural organizations should not make fuller use of bank loans for purchasing better stock and farm supplies of various kinds.

AGREEMENT OF MEMBER.

I hereby agree to:

1. Feed and care for my sheep to the best of my knowledge and ability, to study the bulletins and instructions of the Department of Agriculture and to follow them as closely as possible, and to do personally as far as I am able all the work required in the care and management of the sheep.
2. Submit to the Agricultural Representative for Peel not later than October 31, 1919, a statement including amount of wool sold, grade and price per pound; kinds of feed used; increase in the flock, how disposed of and price if sold and give any further particulars of interest.
3. Use for the first two years at least only a pure bred registered Oxford sire that shall be approved by the Agricultural Representative and if he deems it advisable I shall bring the ewes to some central point to be named by him in order to secure the service of the best sire obtainable.

AGREEMENT OF PARENT.

I hereby agree to:

1. Provide suitable feed, buildings and surroundings to insure the health of the sheep and to advise in their care and management, to encourage member in every possible way and to

see that the agreement signed above is fully carried out.

2. Allow member to do all the business in connection with the sheep and to permit member to retain complete ownership of sheep and their progeny from sale of same.

SCHOOL PROGRESS CLUBS

FROM "ELEMENTARY AGRICULTURE AND HORTICULTURE"

IN order to make the teaching and organization of agricultural classes more effective in connecting the work of the school with the interests of the home and the community, associations called School Progress Clubs should be organized. The membership of such organizations should be composed of pupils, ex-pupils, teachers, and parents.

AIMS AND OBJECTS

1. To promote the cause of Agricultural Education by arranging Club projects bearing directly upon the work of the laboratory and the class-room. In this connection it may be useful occasionally to subdivide the general organization into canning clubs, corn clubs, etc.

2. To improve the school grounds and to exercise some general supervision over school gardens, flower-beds, gates, and fences. The management of Arbor Day improvements might properly, also, be undertaken.

3. To assist in the organization and management of the School Fair and, to a certain extent, to share in the inspection of the home plots.

4. To give some training and practice in leadership.

METHODS OF PROCEDURE

In organizing such a Club the ordinary methods of procedure should be followed, that is, the election of a president and other necessary officers. It happens quite frequently that honorary officers are elected, but this practice is rarely productive of good results. The officers should

be chosen for their zeal and activity, and only those likely to make an effort to become leaders should be appointed. As has already been mentioned, one of the functions of the School Progress Clubs is to develop leadership at a time in the life of the pupil when there is an opportunity for such training under the direction of a teacher.

Wherever possible, the officers of the Club should also be officers of the School Fair Association, in order to link up, as closely as possible with such Associations, the teaching of Agriculture and the work of the school gardens and home projects

SAMPLE PROBLEM

The following problem suitable to a rural school is given, as suggesting the method to be employed in carrying out the idea: -

POULTRY CLUB

As stated above, the Poultry Club should be an organization under the School Progress Club and should contain as members only those undertaking poultry work.

1. April 15th: The organization meeting should ordinarily be held about the middle of April. At this meeting the number of members will be decided upon, and the scope of the work, the duties to be performed by the individuals, and the character of notes to be made will be explained by the teacher.

2. May 1st: Another meeting should be held when the eggs are distributed. At this meeting the precautions regarding kinds of nests

for the setting hen, the candling of eggs for fertility, and the care of the hen during incubation should be discussed.

3. May 18th: The third meeting might be held about two or three days before the chicks are expected to appear. Discuss with the members of the Club the management of the young chicks, and, if at all practicable, the members should make their own coops.

4. June 1st: Discussion of method of feeding; and reporting of results. The care of chickens at large and within wire netting should also be discussed.

5. June 25th: A general survey

of the problem from its commencement should be made. At this meeting the plans for exhibits should be arranged, the kind of coops for exhibition considered, and entries for the autumn exhibit made. If there is a School Fair, the final meeting might be in connection with this. If there is no School Fair, a meeting should be arranged about September 20th, when the poultry should be judged by an expert and the prizes awarded.

Prizes should be awarded (*a*) for the best fowls, (*b*) for the best notes on the project, and (*c*) for the best coop made by the members exhibiting fowls.

SASKATCHEWAN

DIRECTOR OF RURAL EDUCATION ASSOCIATIONS APPOINTED

MR. F. W. Bates, B.A., M. Sc., who has been Director of School Agriculture in the northern half of the province of Saskatchewan, with headquarters at Saskatoon, since 1915, has been appointed Director of Rural Education Associations and School Exhibitions. The rural education association movement has developed so rapidly as to now require a director. This appointment was rendered necessary by the rapid increase in the rural education associations, which number eighty. School exhibitions

were held by about two thousand schools in the province in 1918. Rural education associations are organized to arouse public interest in education and its relation to rural life generally, and in agricultural education in particular; to promote the use of the school garden; to encourage home garden projects and profitable experimental work in the community; to promote school exhibitions; to foster boys' and girls' clubs; and such other activities as will develop an interest in rural life.

Education is a thing that gives a man power to take the initiative, power to be resolute and power to hang on when others fall, and, above all, it gives a man a certain position, and I know nothing in the whole world that seems to me to need a new vision more than the great world of commerce. It is not what you are educated in—it is whether you have got a trained brain.

Dr. ARTHUR EVERETT SHIPLEY, Vice-Chancellor of Cambridge University.

PART IV

Special Contributions, Reports of Agricultural Organizations, Publications, and Notes.

ASSOCIATIONS AND SOCIETIES

EVENTS OF THE COMING MONTHS

- Feb. 4, 5, 6, Annual meeting Ontario Beekeepers' Association, Toronto. Secretary, P. W. Hodgetts, Department of Agriculture, Toronto.
- Feb. 5, Annual meeting of the Canadian Brown Swiss Association, to be held at Sherbrooke, Que., Secretary, Ralph H. Libby, Stanstead, Que.
- Feb. 12 to 14, Saskatchewan Dairy Convention, Secretary, Prof. K. G. MacKay, Saskatoon.
- Feb. 18, 19, Annual meeting of the Ontario Fruit Growers' Association, Toronto. Secretary, P. W. Hodgetts, Department of Agriculture, Toronto.
- Mar. 1, Annual meeting of the British Columbia Entomological Society, Vancouver, Secretary, Williams Hugh, Cloverdale, B.C.
- Mar. 3 to 7, Manitoba Winter Fair, Brandon. Secretary, W. I. Smale, Brandon. Manitoba Poultry Breeders' Show, Brandon, Secretary, W. F. McGuinness, Brandon.

CO-OPERATIVE SOCIETY OF SEED PRODUCERS

BY L. H. NEWMAN, B. S. A., SEC. CAN. SEED GROWERS' ASSOCIATION

In 1914 there was organized in the Province of Quebec, with headquarters at Ste. Rosalie Junction, a Society known as "The Quebec Cooperative Society of Seed Producers." The object of this organization was to encourage the production and use of registered and high class seed on the farms of the Province. In spite of the fact that excellent seed grain can be produced in Quebec, it was found that large quantities of seed, especially oats, were being brought in from Western Provinces. This seed unfortunately was often of low vitality and very frequently contained noxious weed seeds in alarming quantities. The situation became so serious that the late Mr. Gigault, then Deputy Minister of Agriculture, decided that drastic measures must be taken. After ascertaining in his usual thorough manner how similar problems were being solved in other parts of Canada as well as in other countries, he decided that the principle upon which was based the method of the Swedish Seed Association at Svalof, Sweden, was sound, and suitable for application in the Province of Quebec.* He

agreed with the people of Sweden that a problem of this sort could best be undertaken by the farmers themselves. This decision finally resulted in the organization of the above Co-operative Society. In the organization of this body the Provincial Department of Agriculture took the initiative. It recognized first of all that success must depend very largely upon the manager and promoter. Mr. Louis Lavallée, of Ste. Guillaume, a farmer and enthusiastic seed grower, was chosen for the position. The success of this young institution is a tribute to Mr. Lavallée's enthusiasm and ability. In the organization of this Society special credit is also due Mr. Jules Simard, Representative of the Dominion Seed Branch in the Province of Quebec. This gentleman not only gave valuable advice but assisted very materially in obtaining subscribers for stock in the new organization. He also prepared plans for a warehouse and cleaning plant. Unfortunately these plans were not followed exactly at the time but steps are now being taken to complete the building in accordance with the plan originally proposed.

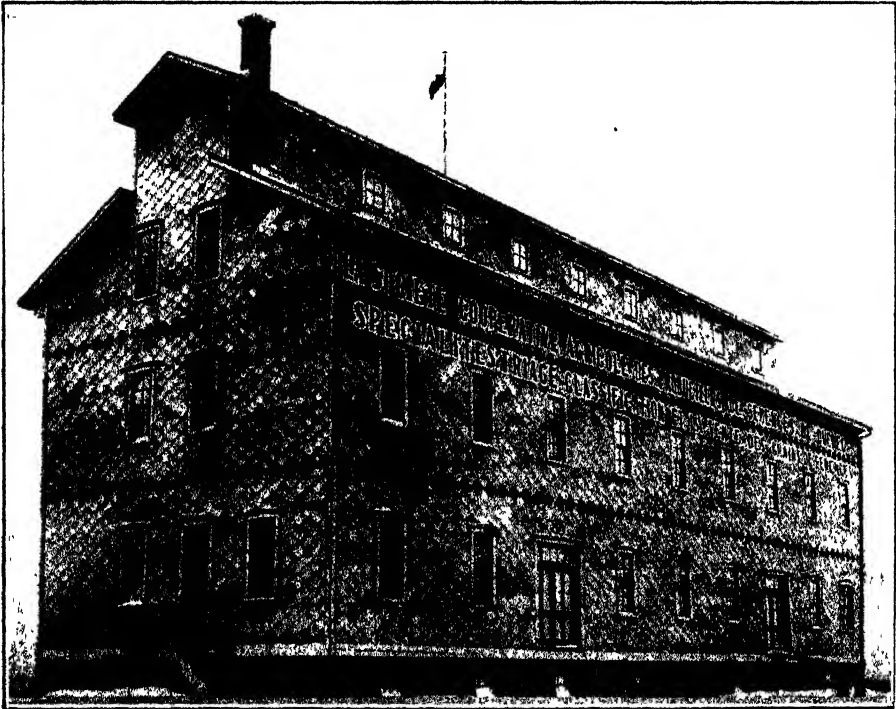
The regulations of the Society require that the latter shall be composed entirely of

*For further information re organization and work of the Swedish Society see book "Plant Breeding in Scandinavia" by the writer.

farmers, all of whom must be stockholders. Each member is required to own at least ten shares of \$10 each. Those preferring to do so may pay for their stock in full. Others must pay at least \$10 per year until the full value of the stock be paid up. Should more than 6 per cent be realized by the Society during any year the surplus is to be placed in a rest fund until this fund shall attain a certain figure. The directors are then authorized to determine what shall be done with the balance. Up to the present 480 farmers have subscribed \$48,070. The assets reported at

tors" during the summer in inspecting crops of seed grown by farmers for the Society.

The Society is the owner of a fine new warehouse and cleaning plant at Ste. Rosalie Junction, the land for the purpose having been purchased by the Provincial Department of Agriculture. This plant is equipped with the finest cleaning and grading machinery available and is thus in a position to turn out seed of unusual quantity. It already has won an enviable reputation on account of the excellent seed disposed of. Some of the money required for the erection of the



WAREHOUSE AND CLEARING PLANT OF QUEBEC CO-OPERATIVE SOCIETY OF SEED PRODUCERS

the last annual meeting of the Society were \$52,605.26. The net profit during the year amounted to \$5,364.54. The total business during the year ending December 31, 1917, amounted to \$56,144.01.

The salary of the manager and three assistants are paid by the Department of Agriculture for the Province. The services of these officers up to the present have been available for other provincial work during the slack season of the year. In lieu of these services the Society receives valuable assistance from Provincial Representatives or "Demonstra-

building and the installation of the machinery was borrowed from the Provincial Government without interest for a term of three years. This money is to be paid back as the business of the Society develops. The building cost approximately \$15,000 and the machinery nearly, \$5,000.

The Society from the beginning has sought to encourage as many farmers as possible to become members of the Canadian Seed Growers' Association so that ultimately their crops might be registered and offered to the Society for seed at a certain price. In this

way a great many farmers have become interested in the matter of growing registered seed but owing to certain regulations which prevailed until recently a comparatively small number have had anything special to offer. At the last annual meeting of the Association the regulations which hitherto had stood in the way of a greater production of registered seed were amended so as to permit any farmer to purchase registered seed from an Experimental Farm or from a member of the Association and have the immediate progeny recognized officially as registered seed providing it be up to standard, be not more than three generations removed from Elite Stock Seed and that it has been properly inspected both while growing and while in the sack prior to shipping. This should not only be a great encouragement and inducement to farmers to purchase registered seed but should also result in a very large increase in the amount of registerable seed produced in the Province. It is hoped by those concerned that within the next two or three years practically all cereal grains handled by the Co-operative Society will be eligible for registration and will be assembled and cleaned at their own warehouse. This incidentally will simplify very greatly the final inspection of registered seed, since the Canadian Seed Growers' Association will be able to place

an inspector in the above warehouse during the cleaning season in order that the cleaning and grading operations may be supervised and all sacks containing seed which is up to standard may be officially sealed with the metallic seal of the Association.

Under the above arrangement it is confidently expected that the seed situation in the Province will be improved immensely if not revolutionized. The scheme seeks to crystallize the efforts of all institutions and organizations which are concerned in the production and use of better seed on the farms of the Province. It aims to follow up as effectively as possible all registered seed distributed in quantity in the Province by all Experimental Stations as well as by individual members of the C.S.G. Association and to have all approved crops produced from this seed given official recognition and used to supply the demand for good seed. The scheme permits registerable seed to be produced and handled at minimum cost and effort to the grower and consequently may be offered the public at a price well within the reach of all. The ability to secure the class of seed which the Society now offers and will continue to offer in ever-increasing quantities should result in an enormous gain to the wealth of the Province.

CANADIAN SOCIETY FOR THE PROTECTION OF BIRDS

The annual meeting of the Canadian Society for the Protection of Birds was held in Toronto on December 31st, 1918. Notices of motion were received providing for the appointment of vice-presidents for the various provinces and for the election of patrons and

benefactors. Mr. Frank F. Payne, Toronto, was elected president, and Dr. N. A. Powell and Charles G. Fraser, vice-presidents. Miss Laura B. Durand, 153 University Avenue, Toronto, was re-elected secretary.

QUEBEC SOCIETY FOR THE PROTECTION OF BIRDS

The annual meeting of the Quebec Society for the Protection of Birds was held in Montreal on January 6th. The programme of activities for the forthcoming season was arranged. This will embrace monthly meetings at each of which a special topic will be discussed. During the summer field rambles

are being arranged for bird study under competent leadership. The following officers were elected: President, Mr. L. M. Ferrill; First Vice-President, Mr. Fred Abraham; Corresponding Secretary, Mrs. W. E. L. Dyer, 12 Willow Ave., Westmount Que.

QUEBEC DAIRYMEN'S ASSOCIATION CONVENTION

The annual convention of the Quebec Dairymen's Association was held at Valleyfield on the 4th and 5th of December. In the opening session the president, Mr. Boyer, retraced the history of the St.-Hyacinthe Dairy School and of the Quebec

Cheese Makers' Co-operative Association. In 1917, the St-Hyacinthe Dairy School delivered 174 milk testing experts' certificates, 311 butter makers' diplomas and 23 inspectors' diplomas; in 1918, 90 milk testing experts' certificates, 216 butter

makers' diplomas and 12 inspectors' diplomas, a total of 926 diplomas.

Mr. Boyer showed the importance of inspectors work. These inspectors who, are fifty in number, visit all the factories, and see that the makers observe the regulations of the association. This inspection ensures a uniform quality for the products. Of all the cheese manufactured in the province of Quebec last year, 70.88 per cent graded No. 1, 27.13 per cent No. 2, and 1.99 per cent No. 3. Quebec

cheese sells at the same price as the cheese of any other province.

It was decided by the Board of Agriculture to grant in 1919, diplomas of excellence to the makers whose products will be graded No. 1 in 1919. Such diplomas will be countersigned by the Honourable Minister of Agriculture for Quebec. The following officers were elected: President, Gustave Boyer, M.P., Rigaud, Que.; vice-president J. H. Crepeau, Ste-Camille, Que.; secretary, treasurer, O. E. Delaire, St. Hyacinthe, Que.

THE UNITED FARMERS OF ONTARIO

The fifth annual convention of the United Farmers of Ontario was held in Toronto on December 18th and 19th. The secretary's report showed that 615 clubs have been organized, a gain of 300 in the past year. The membership is 25,000, distributed in every county in the province. Among numerous resolutions passed was one favouring the formation of a co-operative dairy company in Ontario similar to the Saskatchewan Co-operative Creameries, Limited. The Farmers' Co-operative Company, which is a branch of the parent organization, reported the sale of \$92,952 worth of stock. A wholesale and retail grocery and produce

business at 130 King St. East, Toronto, has been taken over by the Company. Total sales during the year amounted to a valuation of \$1,765,378. It was decided at the Convention to open a business office at Toronto stock yards. The officers were elected as follows:—

The United Farmers of Ontario; President, R. H. Halbert, Melancthon; vice-president, E. C. Drury, Barrie; secretary, J. J. Morrison, Toronto.

The United Farmers' Co-operative Company; President, R. W. E. Burnaby, Jefferson; vice-president, A. A. Powers, Orono; secretary-treasurer, J. J. Morrison, Toronto

ONTARIO CREAMERY ASSOCIATION

A meeting of the Ontario Creamery Association was held in Toronto in December. Resolutions were passed urging the discontinuing the sale of oleomargarine in Canada and commending the system of butter grading inaugurated by the Ontario Department of Agriculture. The following officers were elected: President, William

Newman, Lorneville; 1st vice-president, J. A. McFeeters, Toronto; 2nd vice-president, J. McWaddell, Strathroy; secretary-treasurer, W. G. Jackson, Simcoe; directors, R. M. Player, Walkerton; A. Aldrich, Delhi; L. A. Southworth, Omamee; P. Christie, Ottawa; Representative to National Dairy Council, Mac Robertson, Belleville, Ont.

ENTOMOLOGICAL SOCIETY OF ONTARIO

The Entomological Society of Ontario held its 55th annual meeting at the Ontario Agricultural College, Guelph, on December 4th and 5th, 1918. Addresses on subjects pertaining to the work and objects of the Society were delivered by Father Leopold, La Trappe, P.Q.; W. A. Ross, Vineland, Station, Ont.; Prof. L. Caesar, Guelph; Dr. A. C. Baker, Washington, D.C.; Dr. F. S. Jackson, Montreal; N. Criddle, Treesbank, Man.; J. D. Tothill, Fredericton, N.B.; F. J. A. Morris, Peterborough, Ont.; J. J. Davis, Lafayette, Ind.; Dr. S. Hadwen, Ottawa; Arthur Gibson, Ottawa; Prof. W. Lochhead, Macdonald College, P.Q.; Prof. E. M. Walker, Toronto; F. W. L. Sladen,

Ottawa; and Dr. W. A. Clemens, Toronto.

The following officers were elected for the year 1918-1919:—President, Prof. L. Caesar, Ontario Agricultural College, Guelph; vice-president, Arthur Gibson, Ottawa; secretary-treasurer, A. W. Baker, O.A.C., Guelph; curator, Eric Hearle, Guelph; librarian, Prof. C. J. S. Bethune, O.A.C., Guelph; directors, J. M. Swaine, Ottawa; C. E. Grant, Orillia; Dr. A. Cosens, Toronto; F. J. A. Morris, Peterborough; J. W. Noble, Essex; J. F. Hudson, Strathroy; W. A. Ross, Vineland, Station; Editor of the "Canadian Entomologist", Prof. E. M. Walker, Toronto; Delegate to the Royal Society, the President.

ONTARIO AGRICULTURAL AND EXPERIMENTAL UNION

The fortieth annual meeting of the Ontario Agricultural and Experimental Union was held at the Ontario Agricultural College, Guelph on January 14th and 15th. The co-operative work carried on by ex-students and others in the province of Ontario under the auspices of the Experimental Union included last year, tests of grains, potatoes, fodder crops, hay crops, roots, etc., experiments in the eradication of weeds, experiments in soil requirements. The report of the secretary showed that 3,631 members

conducted one or more of these experiments on their own farms last year. The following officers were elected: President, Hon. Nelson Monteith, Stratford; Vice-president, J. R. Revell, Goderich; Secretary, Prof. W. J. Squirrel; Treasurer, A. W. Mason, Ontario Agricultural College; Directors, Dr. Creelman, J. B. Spencer, Ottawa; H. Nixon, St. George; C. M. Laidlaw, Ceswick, A. F. Hansuld, Ontario Agricultural College.

EASTERN ONTARIO DAIRYMEN'S ASSOCIATION

The forty-second annual convention of the Eastern Ontario Dairymen's Association was held at Belleville on January 9th and 10th. A useful educational programme was carried out and an exhibition of cheese and butter held. The report of Mr. G. G. Publow, chief dairy instructor, showed that in the territory covered by the Association there were in operation 816 cheese factories, representing 30,088 patrons, who delivered from May 1st to November 1st 923,473,464 lbs. of milk, from which was made 83,782,490 lbs. of cheese; 420 patrons had constructed new silos within the year, and 801 patrons are using milking machines. The exhibit of

cheese consisted of 476 boxes, and in butter 50 entries, of which the quality in both cases was pronounced good.

A resolution bearing on the subject of the proposed co-operative dairy company was passed, authorizing the delegation sent to Saskatchewan to study the methods of the Co-operative Creameries, Ltd., to continue action and report progress at the next Convention.

The following officers were elected: President, R. G. Leggat, Newboro; 1st vice-president, T. H. Thompson, Madoc; secretary, T. A. Thompson, Almonte.

WESTERN ONTARIO DAIRYMEN'S ASSOCIATION

The annual convention of the Western Ontario Dairymen's Association was held at London on January 15th and 16th.

The usual exhibition of cheese and butter was held, excellent displays of both being made. The prize-winning cheese secured 98.9 and 97.5 points, and butter from 97 down to 94.5. An interesting feature of the butter show was the section for butter

made in June. The Ontario Agricultural College won the first prize, securing 95.5 points.

The following officers were elected: President, Frank Boyes, Dorchester; first vice-president, W. G. Medd, Woodham; second vice-president, J. Scott, Innerkip; third vice-president, Geo. Taylor, Guelph; secretary-treasurer, Frank Hearn, London.

UNITED GRAIN GROWERS' LIMITED

The Annual meeting of the United Grain Growers, Ltd., was held in Calgary on December 18th and 19th. The attendance included more than two hundred and fifty delegates representing shareholders in Manitoba, Saskatchewan and Alberta. The Honourable T. A. Crerar, Minister of Agriculture for Canada and president of the Company, presided. Three hundred and forty-eight country elevators, of which 232 are owned by the Company, were operated last year. Extensive flour warehouses and coal sheds were also operated. Grain handled by the Company during the year amounted to 29,879,672 bushels. The Company operates a large terminal elevator at Fort William and private elevators at Port Arthur. Co-operative live stock marketing was shown to have developed greatly within the past year. Offices are established at the

stock yards at Winnipeg, Calgary and Edmonton. During the year, 4,402 cars of stock were handled. The Company has large supply warehouses covering eleven acres at Winnipeg and three and a half acres at Calgary and additional houses at Regina and Saskatoon. Sales in the co-operative department amounted to \$5,925,791. The entire earnings of the Company for the year amounted to \$3,047,395. The following officers were elected: President and chairman of the board of directors, Hon. T. A. Crerar; 1st vice-president and general manager, Mr. C. Rice, Jones, Calgary; 2nd vice-president, John Kennedy, Winnipeg; executive directors, J. F. Reid, M.P., Orcadia, Sask., R. A. Parker, Calgary; secretary, E. J. Fream, Calgary; assistant secretary, J. A. Hand, Winnipeg; treasurer, F. M. Black, Winnipeg.

MANITOBA LIVE STOCK ASSOCIATIONS

The annual meetings of the Manitoba Cattle Breeders', Horse Breeders', Sheep Breeders' and Swine Breeders' Associations were held at Brandon during the week commencing January 6th. Mr. W. I. Smale, of Brandon, is the secretary of these associations.

THE MANITOBA CATTLE BREEDERS' ASSOCIATION

The Manitoba Cattle Breeders' Association has a membership of 201 and the Association closed the year with a balance of \$1,108. Resolutions were passed recommending a modification to the present system of levying and collecting assessments on live stock passing through Canadian stockyards; that owners of scrub bulls be liable to a fine of \$50 for the first offense and removal and control under provincial police for the second offence of allowing them to run at large; that a distributing agency be organized for providing bulls of approved character and breeding on the same principle as that provided for stallions.

The following officers were elected: President, J. A. Chapman, Hayfield; vice-president, F. J. Collyer, Welwyn.

MANITOBA HORSE BREEDERS' ASSOCIATION

The Manitoba Horse Breeders' Association passed a resolution recognizing the minimum weight of draught stallions for federal horse breeders' clubs as follows: horses rising three years old, 1,450 pounds; horses rising four years old, 1,650 pounds, and horses over four years old, 1,700 pounds. The following

officers were elected: President, Freeman Rice, Binscarth; vice-president, John Scarff, Hartney; directors, W. McKirdy, Andrew Graham, A. C. McPhail, John Crawford.

Mr. John Graham was re-elected to represent the association on the Western Canada Live Stock Union.

MANITOBA SWINE BREEDERS' ASSOCIATION

The Manitoba Swine Breeders' Association passed a resolution urging the importance of immediate steps being taken to have all meats and meat products in all abattoirs in Canada graded and the grades stamped thereon before the same can be offered for sale. The following officers were elected: President, D. W. Agnew; vice-president, W. C. McKillican, Superintendent Experimental Farm, Brandon; directors, J. Strachan, F. H. Wieneke, A. C. McPhail, and Andrew Graham.

MANITOBA SHEEP BREEDERS' ASSOCIATION

The Manitoba Sheep Breeders' Association occupied much of the time of their meeting in discussing the co-operative marketing of wool. The members were fully persuaded that co-operation was necessary for the safeguarding of the interests of wool growers. A committee was appointed to represent the Manitoba shareholders of the Co-operative Wool Growers, Limited, at the annual meeting to be held at Toronto in February. The following officers were elected: President George Gordon, Oak Lake; Vice-president, W. R. Bowman, Alexander.

MANITOBA GRAIN GROWERS' ASSOCIATION

The sixteenth annual convention of the Manitoba Grain Growers' Association was held at Brandon on January 8th to 10th. About four hundred delegates and others attended. Resolutions were passed bearing on the following points: Recommending that the free admission into Canada of tractors up to \$1,400 be continued; that the Dominion Government extend and elaborate the systems of milling and baking tests of wheat as a guide to fix grades; that a department especially devoted to the study of educational and economic problems of rural life be established at the Manitoba Agricultural College; that the present provincial school library policy be supple-

mented by the inclusion of the principle of the special grant of dollar for dollar in building up a rural community library; that daylight saving legislation be not enacted in the future; that the Hudson Bay Railway with all necessary harbour and terminal facilities be completed immediately. The following officers were elected: president, R. C. Henders, M.P., Winnipeg; vice-president, John L. Brown, Pilot Mound; secretary, W. R. Wood, M.P.P., Winnipeg; directors; C. L. Stoney, Peter Wright, O. A. Jones, D. G. McKenzie, P. D. McArthur, A. J. M. Poole, Bert Griffiths, R. J. Avison, W. I. Ford, W. H. French, Bruce Eadie and Andrew Graham

MANITOBA WOMEN'S GRAIN GROWERS' ASSOCIATION

The first meeting of the womens' section of the Manitoba Grain Growers' Association was held at Brandon on January 8th. The report of the secretary showed that the work so far had been largely of an organizing

character. Up to the end of the year, 43 womens' sections had been organized with a membership of about 600. Miss Mabel E. Finch, Winnipeg, is the secretary.

ALBERTA SHEEP BREEDERS' ASSOCIATION

The annual meeting of the Alberta Sheep Breeders' Association was held at Calgary on December 9th. Votes of thanks were passed to the secretary of the Association and the Canadian Co-operative Wool Growers' Limited for the work they had done in connection with the co-operative sale of wool. It was decided to recommend to the directors of the Calgary Industrial

Exhibition Association that all sheep shown at the summer exhibition must have been properly shorn after the first of April. The following officers were elected: President, Richard Knights, Curtis; 1st vice president, J. W. Renton, Calgary; 2nd vice president, Herbert Smith, Camrose; secretary, E. L. Richardson, Calgary.

ALBERTA SWINE BREEDERS' ASSOCIATION

The annual meeting of the Alberta Swine Breeders' Association was held at Calgary on December 9th. It was reported that the auction sale of swine arranged for in October having to be cancelled on account of the influenza epidemic, considerable loss was sustained. The catalogues arranged

for the sale, it was reported, were being used for sending to prospective purchasers. The following officers were elected: President, W. J. Hoover, Bittern Lake; 1st vice-president, Steve C. Swift, Viking; 2nd vice president, E. J. C. Boake, Acme; secretary, E. L. Richardson, Calgary.

ALBERTA WINTER FAIR

The Alberta Winter Fair held at Calgary in December was much larger than any of its predecessors, there being two thousand entries of live stock. A special feature of this show was the Boys' and Girls' Competitions, for which \$2,679 besides numerous

trophies were offered. For this Competition 16 girls and 25 boys had fitted animals. All of the girls won prizes ranging from \$162.22 down to \$14.12, and the boys \$232.02 to \$5.00.

WOMENS' INSTITUTE NURSING SERVICE

A movement has been set on foot by the Department of Agriculture of British Columbia to establish through the agency of Women's Institutes, a district nursing service corresponding to a system in vogue in the Dominion of New Zealand. In that country hospitals are built and maintained by taxation. The people in the district in which the hospital is situated pay for the cost of building and half the maintenance, the Government paying the other half. At these institutions Government nurses are trained. The Government at its own expense maintains in large and small centres maternity homes that serve as training schools for maternity nurses. By means of trained hospital nurses and trained maternity nurses, the Government maintains a district nursing service for performing minor duties. Still another service, known as the Plunkett Nurses, is established for the

special service of reducing the mortality among babies. So successful has this service been that infantile mortality in New Zealand is now claimed to be the lowest in the world.

The New Zealand nursing system, with the authority of the provincial Department of Agriculture and the approval of the provincial Board of Health, is being laid before individual Women's Institutes of British Columbia, who are asked to begin at once the organization of district nursing services as a branch of the Victorian Order. It was pointed out in a circular letter from the secretary of the Advisory Board of Women's Institutes that an organization should be formed in every school district, or groups of districts, in the province, and that a shortage of financial support for the purpose could be made up from the Duchess of Connaught fund.

THE EASTERN ONTARIO DAIRY TEST

The dairy test carried out at the Eastern Ontario Winter Fair, held in Ottawa, January 13th to 17th, was not as large as two years ago, when eighty-nine cows competed. The test was for seventy-two hours and included only fifteen animals. The decrease was

credited to the facts that no fair was held last year and short notice was given of the test to be held this year. The following records were made by the first prize animal in each class.

HOLSTEINS.

Age, Months.	Name.	Owner.	Lb. Milk.	Lb. Fat.	Total Points, 1919.	Total Points, Winners, 1917.
48 or over. . . .	Quoro Pontiac Segis, 32969	T. P. Charleson, Ottawa.	193 7	3 7	220.330	275.18
Under 36.	Shadelawn Gerben Queen, 39126.	Hopkins Bros . . .	162.5	3.7	194.803	176.72

SHORTHORNS.

48 or under.	Darlington Lizzie	Brethou & Nephews. . . .	161.5	3 7	194.319	183.04
36 and under 48.	Welcome Queen	Alex. McLaren	94.7	3.4	111.676	153.55

AYRSHIRES.

Under 36	Kitty Clover, 55086.. .	T. G. McLaurin, East Templeton, Que.	107.6	3 7	132.834	167 4
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GRADES

48 and over.	Ethel	T. A. Spratt	213 6	3 3	230 310	281.14
36 and under 48	Carnie.	T. A. Spratt.	169.5.	3 5	204 512	217 5
Under 36	Ruth 2nd.	T. P. Charleson .	170.0	3.6	199 760	173 29

GRAIN WEIGHTS ACCORDING TO CLIMATIC CONDITIONS.

A Canadian agricultural official has forwarded to the Agricultural Gazette the following table taken from "The Annals of Applied Biology," Vol. V No. 2 This

table shows the influence of climate on the weight of different classes of grain growing in continental as compared with insular and coast climates.

Group.	Countries.	Average weight in grams of 10,000 grains.					
		Wheat	Barley	Oats	Rye	Average	Ratio
1	Russia	244	333	245	178	250	100
2	U. S. A.	346	347	253	194	285	114
3	Germany	353	399	302	231	321	128
4	Denmark, Norway, Sweden	354	410	322	244	332	133
5	Great Britain, Holland, Belgium	405	440	311	266	355	142
6	Italy, Spain, France	468	465	329	295	389	156
Average for continental climates		314	360	267	201		
Average for insular and coast climates		409	438	321	268		

NEW PUBLICATIONS

DOMINION DEPARTMENT OF AGRICULTURE

SEED BRANCH

Seed Importation Regulations. Pamphlet No. S-12 of the Seed Branch contains the order in council regulations, instruction under the order in council, and a general explanation of the regulations governing the importation of seed of clover, grasses, vetches, other forage-plants, field root and garden vegetables.

PROVINCIAL DEPARTMENT OF AGRICULTURE

ONTARIO

Elementary Agriculture and Horticulture is the title of a new Ontario teachers' manual by Dr. J. B. Dandeno, Inspector of Elementary Agricultural Classes. The subject matter is presented in nineteen subdivisions and covers Nature Study and Agriculture, Suggestions for the Teacher, Equipment, The

Library, Seasonal Course for Form III and IV, School Gardens and other headings covering the range of farm life and experience as related to the school. The manual is generously illustrated.

MANITOBA

Poultry Diseases, Extension Bulletin No. 32, which constitutes the Manitoba Farmers' Library for November is a treatise on poultry diseases by M. C. Herner, B.S.A., Professor of Poultry Husbandry at the Manitoba Agricultural College. The causes, description, and system of treatment of the common ailments of farm poultry are given with graphic illustrations

MISCELLANEOUS

The Gary Schools.—Abraham Flexner and Frank P. Bachman describe in a volume of 266 pages the organization and working of the school system at Gary, Ill. A general account is given of the system which embodies class room and library equipment, including shops for all manner of work carried on in an industrial city, gymnasiums, gardens, playgrounds. It is shown that two distinct bodies of material are employed at Gary as definite subjects that have in the last resort to be "learned" in such wise that the pupil may attain and demonstrate a reasonable degree of mastery; on the other esthetic or other activities, giving wholesome pleasure at the time and tending to establish higher levels of need and taste. The book is published by the Education Board, 61 Broadway, New York, N.Y.

NOTES.

Owing to the continued seriousness of the influenza epidemic in the province of Alberta the Agricultural Schools at Claresholm, Vermilion, and Olds will not enroll regular students until next autumn.

Mr. W. H. Scott, B.S.A., Director of Drainage Demonstrations and Lecturer on Drainage in the Department of Physics at the Ontario Agricultural College died from pneumonia following influenza on January 9th.

Upwards of fifty returned soldiers are taking the special course in Agriculture at the College of Agriculture in the University of Alberta. At least as many more returned men are expected to join the class during the spring months.

Agricultural Representatives in the province of Ontario have been asked by the Seed Commissioner for Canada to assist in procuring oats fit for seeding in Saskatchewan and Alberta of which large quantities are likely to be required.

More than 80,000 boys and girls in the United States are enrolled in pig clubs organized and conducted by the United States Department of Agriculture and the State agricultural colleges, and 71 per cent of the reporting members raise pure bred pigs.

Professor J. P. Sackville, who in July last left the Animal Husbandry Department of the Ontario Agricultural College to join the staff of the Grain Growers' Guide as live stock editor, has returned to his former position of Associate Professor of Animal Husbandry.

The annual meeting of the General Live Stock Breeders' Associations of Quebec including the French Canadian Horse Breeders' Association, the French Canadian Cattle Breeders' Association, the Quebec Sheep Breeders' Association, and the Quebec Swine Breeders' Association, will be held at the Place Viger Hotel, Montreal, on February 19th. Through an error these meetings were announced in the January Gazette to take place on February 4th. The secretary of these associations is Mr. J. A. Couture, Quebec.

Mr. W. H. Day, Professor of Physics at Ontario Agricultural College for the past twelve years, has resigned to enter commercial life. Professor Day has been closely associated with the development of the farm drainage work of the Department of Agriculture that has been carried to most of the counties of the province through the Agricultural Representative. Professor Day has also given close study to the protection of buildings from lightning. He leaves his old position at the first of March.

Three members of the Experimental Farms staff are employed as teachers in the Khaki University in England. Mr. J. A. Clark, Superintendent of the Experiment Station at Charlottetown has been given leave of absence especially for this work. Mr. M. B. Davis, Head of the Vegetable section of the Horticultural Division of the Experimental Farms System who was active in artillery service is now devoting his time to lecturing in the University as is also Capt. P. D. Donaldson, formerly herdsman of the Experimental Farm at Nappan, N.S.

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PART V

The International Institute of Agriculture

FOREIGN AGRICULTURAL INTELLIGENCE

All communications in regard to this section should be addressed to T. K. Doherty
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SCIENCE AND PRACTICE OF AGRICULTURE

GENERAL INFORMATION.

951—On the Possibility that Man can Live on a Diet Containing no Fat; Researches in Denmark.—*Ugeskrift for Landmaend*; Year 63, No. 22, pp. 296-298. Copenhagen, May, 1918.

Previous researches aiming at ascertaining if there is a minimum of fat required in the human diet have led to the general conclusion that man cannot live without a certain quantity in his diet, otherwise he will become unhealthy and may even endanger his life. Physiologists are not agreed as to the exact daily minimum of fat required by the human being for continued well-being. VOIT fixed the amount at 56 gm., TIGERSTEDT at 80 or 100 gm., while SOFUS TORUP also indicates the latter figures and says that, during the present war, a characteristic unhealthy state has appeared which he calls "fedthunger" (fat hunger) and which has appeared in those countries where there is a shortage of fats, a state resembling that of Nansen's companions in the Greenland expedition. Numerous researches, using rats, have been made in the United States on this subject; when the rats received a diet absolutely free from fats, they became diseased, recovery being obtained on giving them the substances that were lacking. But the substances under question acted specifically in this case, some having a positive action, *i. e.*, producing recovery (fat from butter, egg yellow, liver oil, etc.), while others (fat from pig, olive oil, almond oil, etc.) did not bring about recovery or the return of the animals to the normal state. It was concluded that the effect was not due to the fats themselves, and that it was once more a question of "vitamines".

In order to obtain more definite information on the subject, Dr. HINDHEDE made some observations on two strong, healthy persons, one a gardener, aged 31 years, and the other a student, aged 24 years. The subjects received, for more than a year, a diet "practically" free from fats, consisting of bread, potatoes and vegetables, variation being obtained by introducing, at stated periods, sweetened gruel. The two subjects were

kept in very good condition while they were fed on bread, potatoes and vegetables; on the contrary, however, they lost flesh when the vegetables were replaced by the sweetened gruel. HINDHEDE admits that young, robust persons can live in perfect health for 16 months (and more, as the experiment is still in progress) on a diet of bread, potatoes, cabbages, rhubarb and apples, while a diet composed exclusively of sweetened gruel could apparently not be tolerated for more than a month. He therefore concludes that the different vegetables contain vitamins similar to those found in fats, and that the latter can be very well dispensed with provided they are replaced by vegetables. This also explains the insufficiency of the sweetened gruel. Owing to present circumstances the diet in Germany is characterised by penury of fats; although, generally speaking, the effects of such a state of affairs have not been so serious as might have been supposed, certain unhealthy conditions have appeared, contrary to the observations of HINDHEDE, amongst which is that called "Kartoffelkrankheit" (potato disease) by DÖLLNER; but it appears that this disease was cured by adding vegetables to the potatoes. Similarly, HINDHEDE attributes all the unhealthy conditions produced in Germany by the lack of fats to the lack of vitamins in the food. He thinks that there is no great need of alarm at the prospect of an eventual total lack of meat and fat* provided that care is taken to supply sufficient seeds, potatoes and vegetables.

In conclusion, HINDHEDE deduces some observations of practical value from his thesis. Those who have little land should devote as much as possible of it to market-gardening. In this way it has been calculated that Denmark could maintain 20 million individuals, if the live stock industry were suppressed. Although the exclusive growth of plants is not desirable and as these deductions are obviously as yet insufficiently sure to allow of their practical use, they are of great interest from the physiological point of view in that they apparently show that the human being can, without much risk, do without fats during a certain period.

952—**The Feeding of Cattle and "Barlow's Disease" in Children Caused by Milk.**—*Nordisk Mejeri-Tidning*, Year XXXIII, No. 24, p. 284. Stockholm, June, 1918.

"Barlow's disease" so resembles scurvy that it is often called infantile scurvy. It appears in children fed exclusively on sterilised and boiled milk. It is obvious that the time required in heating milk has an influence on its vitamin content. Moreover, it is generally believed that milk is richer in vitamins during the summer when the fodder given to the cattle is fresher, than in winter when they chiefly feed on dry fodder. On the other hand, if roots are fed heavily in winter, milk might be produced that is richer in vitamins than the milk usually produced during that season, and thus have the effect of rendering the appearance of Barlow's disease more rare.

In any case, it is safest to pasteurise milk for children at a low temperature, the best method being to heat the milk for 30 minutes at 63° C. (145° F.).

CROPS AND CULTIVATION

956—**Chemical Composition, from an Agricultural Point of View, of Rainwater Collected at Montevideo, Uruguay, from 1909 to 1912.**—CHROEDER, J., in the *Revista del Instituto Nacional de Agronomía de Montevideo*, Ser. II, No. 1, pp. 29-48. Montevideo, January, 1918.

In a previous report (*Revista del Instituto N. de Agronomía*, Montevideo, 1910, No. 7, p. 123) the author published the results of his observations on the carbonic acid content of the air at Montevideo. These results showed that the amount of the gas present varies greatly with the season and the direction of the wind. The average content is 2.98 volumes per 10,000 volumes of air under normal conditions, at 0° C and 760 mm.

The report under review gives a series of data relating to the amount of nitrogenous compounds, chlorides (expressed as sodium chloride) and organic matter carried to the soil by rainwater during the period 1909-1912. The work done on the chemical composition of rainwater in all parts of the world is first reviewed rapidly, and the author then gives the results of his own observations, which are summarised in tables. These observations, made at the Sayago experiment field at the Agricultural Institute of Montevideo, lead to the following conclusions:—

With a total precipitation of 1,504 mm. (59 inches) per annum (in 1912), 1 acre of the Sayago experiment field received 6.88 lb. of combined nitrogen, of which 3.28 lb. was ammoniacal and 3.60 lb. nitrous and nitric. At the end of 24 months of observation (May to September, 1908; October, 1911 to February, 1913) the same area received 7.03 lb. of ammoniacal nitrogen and 6.09 lb. of nitric nitrogen, *i. e.*, 12.23 lb. of nitrous and nitric nitrogen, or 6.10 lb. per acre annually. The nitrogen content of rainwater of 18 tropical countries and of 96 temperate

countries (50 observations) is given. A comparative examination shows that the figures obtained at Sayago are slightly higher than those for the tropical and temperate countries.

The author was unable to prove that the seasons had any influence on the amount of nitrogen, which, moreover, he thinks only worth considering as a source of nitrogen for agriculture. The quantity of chlorides (expressed as sodium chloride) carried to the soil by rainwater is 73.60 lb. per acre. The chloride content of the rainwater seems to depend on the direction of the wind while the rain is falling.

The amount of organic matter (calculated in milligrams of oxygen required to burn it) was on an average 750 mgm. of oxygen per 1,000 litres of rainwater. The evaporation residue of rain is, on an average 303 lb. per acre annually, of which 108 lb. disappear on burning, and 195 lb. form a non-volatile residue.

In conclusion the author points out that these figures refer to the Montevideo district and not the interior of the country.

957—**Some Notes on the Direct Determination of the Hygroscopic Coefficient.**—ALWAY, F. J., KLINE, M. A. AND MCDOLE, G. R., in the *Journal of Agricultural Research*, Vol. XI, No. 4, pp. 147-166 + Bibliography of 27 Publications. Washington, D. C., October 22, 1917.

The hygroscopic coefficient expresses the percentage of moisture contained in a soil which, in a dry condition, has been brought into a saturated atmosphere, kept at a constant temperature, and allowed to remain until approximate equilibrium with this atmosphere has been attained. It has a two-fold significance, both serving as single-valued expression of the relative fineness of texture, and, in soil-moisture studies, permitting the approximate estimation of the maximum amount of water available for growth and for the maintenance of plant life—the difference between the total amount of water and the hygroscopic coefficient.

The error is sometimes made of confusing MITSCHERLICH'S "Hygroskopizität" with the hygroscopic coefficient as above defined. The former is determined by allowing the exposed soils to come into equilibrium with an atmosphere in contact with a 10 per cent sulphuric acid solution instead of with water, MITSCHERLICH holding that the determination by HILGARD'S method gives results much too high on account of the condensation of moisture on the exposed samples.

HILGARD'S method was described by him (Report on the Methods of Physical and Chemical Soil Analysis, *U. S. Dept. of Agr., Division of Chemistry*, *Bulletin* 38, 1893, pp. 60-82) as follows:—

The fine earth is exposed to an atmosphere saturated with moisture for about twelve hours at the ordinary temperature (60° F.) of the cellar in which the box should be kept. For this it is sifted in a layer of about 1 mm.

thickness upon glazed paper, on a wooden table in a small water-tight covered box (12 by 9 by 8 inches) in which there is about an inch of water; the interior sides and cover of the box should be lined with blotting paper, kept saturated with water, to insure the saturation of the air.

After eight to twelve hours the earth is transferred as quickly as possible, in the cellar, to a weighed drying-tube and weighed. The tube is then placed in a paraffin bath, the temperature gradually raised to 200° C. and kept there 20 to 30 minutes (rapidity of raising temperature depending upon the amount of moisture in the soil), a current of dry air passing continually through the tube. It is then weighed again, and the loss in weight gives the hygroscopic moisture in saturated air.

Some time later, to avoid the decomposition of the organic matter of surface soils, HILGARD modified the method to the extent of using an air bath, raising the temperature to only 110° C. (230° F.), keeping the sample in for an hour, weighing, drying again, and continuing the process until a practically constant weight was obtained.

The authors have tested this method by studying the following points: rapid loss of hygroscopic moisture; suitability of trays of various materials; influence of time of exposure; effect of great fluctuations in the temperature of the room; effect of grinding; influence of size of absorption boxes and the number of tables; concordance of determinations in practice; reliability of the method described by HILGARD; modification of method when sample contains gravel or pebbles; they arrive at the following conclusions:—

The amount of hygroscopic moisture absorbed increases with the rise of temperature. Drying of mineral soils at temperature of 100° to 110° C. does not appreciably decrease their hygroscopicity. Intractable samples may be reduced in a steel mortar to pass a 1mm. sieve without appreciably affecting their hygroscopicity.

Twelve hour's exposure in the absorption boxes is sufficient only when the soil layer is very shallow. In practice a longer interval is found more convenient, 20 to 24 hours proving very satisfactory. An exposure of more than 24 hours gives higher values only in the case of very fine textured soils.

A soil containing the amount of moisture corresponding to its hygroscopic coefficient loses water very rapidly when exposed to an ordinarily dry atmosphere, but in determining the hygroscopic coefficient the time necessary to transfer the soils from the absorption boxes to weighing bottles is so brief that the loss during the transfer is too small to appreciably affect the accuracy of the results.

HILGARD's method for the determination of the hygroscopic coefficient carried out exactly as he describes it, gives reliable results. However, the loose sheets of glazed

paper used are very inconvenient when many determinations are to be made and may be advantageously replaced by shallow trays, either of aluminium or of copper. Trays of glass, graniteware, and vulcanized rubber give satisfactory results, but are less convenient, while those of tin plate or zinc, although satisfactory at first, soon corrode. Pasteboard trays lined with glazed paper give results much too low, unless the period of exposure be greatly prolonged, and even those of paraffined pasteboard lined with glazed paper give somewhat low results. Any considerable increase in the size of the absorption boxes over that recommended by HILGARD or the use of a larger number of exposed samples within the boxes of the same size cause too low results, unless the time of exposure be greatly increased.

959—Influence of Nitrates on Nitrogen-Assimilating Bacteria.—HILLS, T. L. (in the *Journal of Agricultural Research*, Vol. XII, No. 4, pp. 183-230+31 Tables+Bibliography of 49 Publications. Washington, D. C., January 28, 1918. (2 pp. in Institute Bulletin).

961—Effect of Sulphur on Different Crops and Soils.—SHEDD, O. M., in the *Journal of Agricultural Research*, Vol. XI, No. 4, pp. 91-103. Washington, D. C., October 12, 1917. (1 page in Institute Bulletin).

963—Plants Tolerating Salt.—FENZI, E. O., in the *Bollettino della R. Societa Toscana di Orticultura*, Year XLIII, Nos. 5-6, pp. 37-39. Florence, 1918. (1 page in Institute Bulletin).

969—Injurious Action of Magnesium Carbonate on Plants.—COUPIN, H., in *Comptes rendus des Seances de l'Academie des Sciences* Vol. CLXVI, No. 24, pp. 1006-1008. Paris, June 17, 1918.

On account of its insolubility in water, magnesium carbonate, so common in the soil, is generally considered incapable of any injurious action on plants, and, consequently, of having any influence on the life of plants and on their geographical distribution. Nevertheless, this salt dissolves in small quantities in water containing carbonic acid, as occurs near roots which give off carbonic gas during respiration. In order investigate the effect of the carbonate thus dissolved the author carried out various germination tests, some in fresh water, some in the same water containing an excess of magnesium carbonate. After a few days in the same environment—darkness and a constant temperature of 24°C (75° F.)—the results were compared.

Apart from a few exceptional cases (e.g. that of stone pine) magnesium carbonate was decidedly injurious to plants but in a manner and to a degree which varied according to the species. This noxiousness manifested itself:—1) by decreased length of the

main root; 2) by a considerable reduction of the number and size of the rootlets; 3) by black or brown colour of the roots and rootlets; 4) by reduction of the absorbent hairs (when, as is rather exceptional, they form in an aqueous environment); 5) by shorter aerial parts (except in the case of common cress). In no case did magnesium carbonate appear to have any useful effect, at least under the conditions of the experiment.

972—Choice of Material for Isolating Inflorescences in Selection Work.—

FRUWIRTH, C., in *Zeitschrift für Pflanzenzucht*, Vol. V, Pt. 4, pp. 391-395. Berlin, 1917.

The nature of the covers used to isolate the inflorescences is not without influence on the fructification because a certain amount of light may be necessary for the normal development of the seed, especially at

the beginning of setting, as was observed by SCHOLZ for the poppy and LUBIMENKO for the pea and wheat.

The author made similar observations for:—*Triticum sativum* (winter and spring wheats); *Hordeum distichon erectum* and *H. distichon nutans*, *Pisum arvense* and *P. sativum*, *Phaseolus vulgaris*, *Papaver somniferum*, *Arrhenatherum elatius*. During his investigations he used covers of various strength, from parchment bags, which allow the light to pass fairly well, to small wooden boxes lined with black paper used for wrapping up photographic plates. In this last case no seed formed while with the less stiff and opaque covers the number of seeds formed decreased. On the other hand, the amount of light absolutely necessary is not the same for all plants, but varies from one species to another, as is shown by the Table:—

	Black paper bag		Parchment bag		No cover	
	Number of inflorescences	Number of seed formed	Number of inflorescences	Number of seed formed	Number of inflorescences	Number of seed formed
<i>Pisum arvense</i>	5 flowers	0	5 flowers	8	5 flowers	14
Barley NolkA Imperial	5 ears	55	5 ears	94	5 ears	112
Wheat 104 Ciewener.	5 "	88	5 "	129	5 "	196

The covers used to isolate inflorescences must, therefore, be fairly transparent as the absence of seeds formed is often attributable to insufficient light rather than phenomena of self-sterility.

977—Wheat, Yields per Acre and Prices, by States, for the 50 Years 1866-1915 in the United States.—U. S. Department of Agriculture, Bulletin No. 511, 16 pp. of tables. Washington, February 13, 1917.

The year 1915 completed the first 50 years during which the United States Department of Agriculture has collected annual data on the yield and value of the most important crops in the different States of the Union. The bulletin under review gives the annual figures for wheat from 1866 to 1915. The tables referring to the different States are preceded by general figures for the production in the whole of the United States and

six divisions of the country;—1) *North Atlantic*, including the States of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey and Pennsylvania—2) *North Central, East*: Ohio, Indiana, Illinois, Michigan and Wisconsin—3) *North Central, West*: Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, and Kansas—4) *South Atlantic*: Delaware, Maryland, Virginia West Virginia, North Carolina, South Carolina, Georgia and Florida—5) *South Central*: Kentucky, Tennessee, Alabama, Mississippi, Louisiana, Texas, Oklahoma and Arkansas—6) *Far West*: Montana, Wyoming, Colorado, New Mexico, Arizona, Utah, Nevada, Idaho, Washington Oregon, and California.

The 10 year averages of wheat yields in bushels per acre for the whole Union and for these 6 divisions respectively were:—

	United States	North Atlantic	North Central, East	North Central, West	South Atlantic	South Central	Far-West
1866-1875.....	11.9	13.7	12.2	13.5	8.4	8.5	15.7
1876-1885.....	12.3	14.1	13.9	12.0	8.9	8.0	14.1
1886-1895.....	12.7	14.2	13.8	12.4	8.8	9.6	14.2
1896-1905.....	13.5	16.2	13.4	13.1	10.8	11.6	17.3
1906-1915.....	15.0	18.1	16.3	13.6	13.0	12.4	22.4

978—Cultivation of Manitoba Wheat in Touraine, France.—SCHRIBAUX, in *Comptes rendus des Seances de l'Academie d'Agriculture de France*, Vol. IV, No. 17, pp. 528-530. Paris, May 15, 1918.

The author gives the following conclusions deduced from an investigation made by M. MARTIN (Director of the Agricultural Department of Indre-et-Loire):—In the least successful experiments Manitoba wheat gave 7 to 11.92 cwt. per acre. Everywhere else the yield varied from 9.54 to 16.72 cwt.; the average might without exaggeration be placed at 11.14 cwt. per acre. These figures are all the more remarkable because the average yield of winter wheat is 8.34 cwt. There is no doubt that 1917 was a very favourable year for wheat-growing in that district; May and June were wet and there was no excessive heat in July. In spite of all disadvantages M. MARTIN considers Manitoba wheat excellent for Indre-et-Loire. Thanks to this new variety it will be possible to sow wheat in spring which could not be sown in autumn.

The author shows the extent to which Manitoba wheat is penetrating and spreading in countries where it was totally unknown—Piedmont, Greece, etc. Most of the reports received by the author favour its cultivation. The fact that some tests have not given the hoped-for results is due to insufficiently sorted seed. To prevent this farmers should ask for 110 to 120 lb. of Manitoba for every 100 lb. of seed to be sown. This wheat is too small to pass through a sorter; it is sufficient to pass it through a 2 mm. mesh sieve to eliminate foreign, broken, or small and malformed grains and obtain excellent seed. In a good lot the waste will not exceed 10% and may be used for making flour. Failure often results from using too little seed. As Manitoba tillers little 1.59 cwt. per acre should be the smallest amount used. The actual amount must, however, be determined by the farmer, who must bear in mind that it should be sown more thickly than ordinary varieties, and greater quantities be used the later it is sown.

997—The Douglas Fir: Its Importation and Cultivation in Central Europe (1).—BERKHOUT, A. H., in *Mededeelingen van de Landbouwhoog-school en van de daaraan verbonden Instituten*, Vol. XIV, Pt. 1, 2 and 3, pp. 47-56 + 5 Tables. Wageningen (Holland) 1918.

The American tree commonly known as the Douglas fir was discovered in North America in 1792 by the explorer ARCHIBALD MENZIES and imported into Europe by DAVID DOUGLAS in 1827. The Douglas fir has many names in America—red fir, black fir, hemlock, swan pine, etc. The confusion of botanical names is no less great and is due to the fact that botanists disagree as to the genus to which it belongs; they call it *Abies Douglasii* Lindley, *Pinus Douglasii* Sab.,

(1) See also Bulletin of Foreign Agricultural Intelligence, June, 1915, No. 194.

Pinus taxifolia Lamb; *Picea Douglasii* Link, *Tsuga* or *Pseudotsuga Douglasii* Carr. There are many varieties of Douglas fir—blue, green, bluish-green (*glauca*), etc.; the last of these has smaller cones and is of slower growth. Douglas fir is one of the most widespread trees in America and is found particularly in the Rocky Mountains, Sierra Nevada, Colorado, and British Columbia. Its geographical distribution is between 43 and 52° north latitude. A well-aerated, very light soil containing a certain proportion of sand and stones, suits it best. It can stand a damp atmosphere better than excessive drought and should be sheltered from continuous winds. In the state of Washington it does very well up to 1,150 feet, and in Oregon up to 1,800 feet; above this altitude its growth is more restricted. According to MAYR, Douglas fir is very resistant to frost in its native country, indeed, it grows in districts where the temperature is sometimes below -25°C. If its importation into Europe has not always given the expected results this is due to the fact that care has not always been taken to use seed from a district in which the environmental conditions are similar to those of the district in which plantations are to be made. It has also been shown that the poor sandy soil, as well as the marsh soil or excessively clayey soil of central Europe, do not suit it. The young plants may also be attacked by a fungus—*Botrytis Douglasii*—and by a canker—*Pestalozzia funera* Desm.

The rapid growth and excellent quality wood of the Douglas fir make it one of the most profitable trees for silviculturists. Data collected by HANZLICK on several plantations show this tree to have attained the following average weights and diameters (in the middle):—in 20 years, 29.83 feet and 0.35 feet; in 40 years, 76.32 feet and 0.69 feet; in 60 years, 101.25 and 1.01 feet; in 100 years, 125.55 feet and 1.34 feet. This fir may reach a height of 330 feet and a diameter of 16.40 feet. On the damp west coast of North America it generally attains in 80 years a height of 130 feet and a diameter of 2.62 feet. Of two neighbouring plantations at the Experiment Station of Wageningen one of these plantations of 18 years had an average height of 38.15 feet and an average diameter of 0.45 feet. The data show that this tree had a diameter of 0.49 feet at Wageningen five years earlier than in its native country. Growth is not less rapid in other parts of Europe. In Germany (Oldenburg), a 37 year old plantation had an average height of 59.04 to 65.60 feet and an average diameter of 1.95 feet. Similar figures were obtained in England.

The wood of Douglas fir is solid and very resinous and used for many purposes, such as building wood, props and supports for mines and shipyards. As timber and wood for commercial purposes it polishes very well and is used for cabinet work, and for making parquet and wainscoting. In Germany,

the wood of a 25-year old tree had a specific weight of 0.536 and a resistance to pressure of 443 to 531 kg. per sq. cm.

The author foresees more numerous plantations of this tree in all central Europe, especially in places sheltered from strong winds and in clearings. The necessity of the choice of seed suited to the district, *i. e.*, from a country where the climatic conditions are as similar as possible, is emphasized. In Holland such seed-control is assured by the Dutch Association for the Development of Land.

LIVE STOCK AND BREEDING.

999—Purifying Water for Stock.—*Queensland Agricultural Journal*, Vol. VIII, Pt. 4, p. 209. Brisbane, October, 1917.

Water containing mud in suspension is easily clarified by dropping hot wood ashes into it, or by the application of lime or alum. These two substances make the water hard. Chloride of iron may be also used; it is quite harmless, and a valuable reconstituent and tonic for all animals. One lb. of chloride of iron will clarify 1,000 to 2,500 galls. of water and much reduce the bacterial content.

A simple method of purifying water without boiling has been devised by Dr. NAISMITH and Dr. GRAHAM. The method consists in adding a level teaspoonful of chloride of lime (containing $\frac{1}{2}$ available chlorine) to a cupful of water. Dissolve, dilute with 3 more cupfuls of water, allow to stand for a few seconds; this stock solution, kept in a tightly stoppered bottle, may be used for 5 days. Add a teaspoonful to 2 galls. of water to be purified; stir well to bring the weak chlorine solution in contact with all the bacteria, and allow to stand for 10 minutes. This will destroy all typhoid and colon bacilli, or other dysentery producing bacilli in the water. The water will be without taste or odour and the trace of free chlorine added rapidly disappears.

1008—I. Morphology of Normal Pigs' Blood.

II. Effects of Muscular Exercise and the Heat of the Sun on the Blood and Body Temperature of Normal Pigs.—PALMER, C. C. in: I. *Journal of Agricultural Research* Vol. IX, No. 5, pp. 131-140. Washington, DC., April 30, 1917; II. *Ibid.*, Vol. IX, No. 6, pp. 167-189 + Bibliography of 9 Publications. May 7, 1917. (2 pp. in Institute Bulletin.)

1009—Investigations into the Action of the Thyroid Gland, in the United States.—

I. ALLEN, B.M., The Results of Thyroid Removal in the Larvae of *Rana pipiens*, in *The Journal of Experimental Zoology*, Vol. XXIV, No. 3, pp. 499-520 + 4 Tables + 8 Figs. + 1 Plate.—II. SWINGLE, W. W., The Acceleration of Metamorphosis in Frog Larvae by Thyroid Feeding and the Effects upon the alimentary Tract and Sex Glands, *Ibid.*, pp. 521-543 + 1 Table + 14 Figs. + Bibliography of 11 publications. Philadelphia, January, 1918.

1012—Aquatic Plants Which May be Used as a Food for Cattle: Investigations in Holland.—*Nederlandsch Weekblad voor Zuivelbereiding en Veeleel*, Year XXIV, No. 10, p. 2. Doetinchem, June, 1918.

1013—Digestible Hay Cake and Hay Paste.—GAIN, E., in *Comptes rendus des Seances de l'Academie d'Agriculture de France*, Vol. IV, No. 17, pp. 539-545. Paris, May 15, 1918.

1014—The Zebra and its Hybrids as Domestic Animals.—FAWCETT, W., in *La Hacienda*, Vol. VIII, No. 8, pp. 242-245 + 9 Figs. Buffalo, N.Y., May, 1918.

For more than a century attempts have been made in various countries to utilize the zebra and its hybrids for agricultural purposes. The zebra can be bred as a domestic animal. The first hybrids were obtained by crossing a female zebra and ass, then by crossing a female zebra with a horse, and also by crossing a mare with a male zebra. A zebra \times ass cross was obtained by LORD CLIVE towards the end of the 18th century; later on similar crosses were obtained in France and Italy. Further crosses were also obtained, especially in Great Britain, Australia and France. Crosses were obtained in Brazil in 1899 and 1900 and also in Scotland (by Prof. COSSAR EWART) between small pony mares and male zebras. Herr HAGENBECK has obtained crosses between female zebras and pony stallions.

The different species of zebra have all been used for crossing, and some seem better suited than others. Burchell's zebra (which was used by Prof. EWART for crossing) has been used very often; the mountain zebra, common in South Africa, has been used. For other crosses, especially those carried out by the U. S. Government, Grevy's zebra was used. This latter is somewhat larger than the others, being 52 and 56 in. high; an adult animal weighs from 770 to 880 lb. It occurs in Abyssinia and Somaliland, but it is gradually becoming rarer and rarer, while it is with difficulty transported from the place of capture to countries across the sea. Although it has never been domesticated, it is docile and would probably be easy to domesticate and rear. The male shows great dislike of mounting large mares, even if he has grown up with them from a foal. On the other hand he readily mounts small mares or she-asses.

The hybrids obtained in the United States are very vigorous and resist the cold of temperate regions as well as does the ass. They show a decided improvement over the parents as regards their form, movements, and way of standing. The average weight at birth is 48 lb.; at 1 year 275 lb., when the average height is 48 in.

The cross she-ass \times zebra are very obstinate and hard-mouthed, which constitutes an obstacle to their use as working animals. On the contrary the cross mare \times zebra is

more docile and tractable, and can be used like the mule, over which it has the advantage of being much better shaped.

In crosses made in the United States between mares and zebras the stripes in the coat of the hybrid were indistinct and the characters of the mother predominated. In other crosses made in South America and Europe the characters of the father were predominant and the stripes were still more marked than those of the father.

1017—Mussels as Food for Pigs, Investigations in Denmark.—*Ugeskrift for Landmaend*, No. 23, pp. 313-314. Copenhagen, June, 1918.

1019—The Use of Weevily Wheat for Poultry Feeding.—*Agricultural Gazette of New South Wales*, Vol. XXIX, Part. 4, p. 292. Sydney, April, 1918.

Methods for utilizing wheat-meal made from weevily wheat for feeding poultry have been tried in the Chemist's Laboratory of the Department of Agriculture, New South Wales. A mixture of 1 of bran to 2 of wheat-meal gave a coarse mixture, but it made a good mash. One part of bran to 3 of wheat gave a good mash of better appearance, while 1 of bran to 4 of wheat gave a mash of good appearance, that seemed too adhesive for poultry. The bran should be first scalded and then the other ingredients worked into it.

1020.—The Use of Seaweed in Poultry Feeding.—DECHAMBRE, P., in *L'Agriculture pratique*, Year LXXXII, Vol. XXXI, No. 12, pp. 230-231. Paris, June 13, 1918.

The author describes the experiments made by M. MOTTE, at Tregastel, Cotes-du-Nord, on the feeding of poultry with seaweed. Ten hens and ten ducklings were fed first on *Laminaria*, then on all kinds of algae. The algae were freed from salt by being washed several times in fresh water (this washing is not indispensable). They were then chopped into small pieces from 3 to 5 mm. long; this is easier if they have previously been partially dried. They are then mixed with boiled crushed potatoes and put in a baker's oven for three hours or cooked over a low fire. When the whole is well jellied it is kneaded and distributed to the poultry. The ration given the poultry experimented with varied from 6.6 to 8.8 lb. of algae mixed with 2.2 lb. of potatoes. No grain was fed.

Later the potatoes were deducted from the rations for the ducks, which ate the algae alone and fattened as rapidly as those fed normally. This was also attempted with the hens which, however, refused the algae alone, so that the potatoes had to be added and, later, swedes. The hens developed well, laid normally and their flesh had no peculiar flavour. The results were satisfactory in every way.

FARM ENGINEERING.

1022—Hints on the Use of an Agricultural Tractor.—Extracted from *La Journée*, in the *Bulletin Mensuel de la Chambre Syndicale des Constructeurs de Machines Agricoles de France*, No. 3, pp. 143-144. Paris, May, 1918.

It is important, in the first place, that the field of action of the tractor should not be too wide. If it is true that the majority of tractors are well sprung nowadays, it is none the less true that their chief use is not that of running about on the road. First, these journeys waste time, petrol and oil, and end by over-working if not damaging the machine. This results in time wasted, expensive repairs, the machine being held up, and the delay of urgently-needed work, without considering that all these journeys and delays considerably decrease the daily yield of the machine and that the extra cost due to running on the road, increases the bill of the tractor. This means a higher cost for ploughing an acre, the price in reality falsified by the bad use of the tractor. For example, a 20-h.p. tractor working on a 20-acre field at the rate of 5 acres per day, will, by long, frequent journeys, decrease its yield to 2.5 and 3.7 acres, a yield which does not justify the use of a tractor.

The tractor should also be used intensively, *i.e.*, night and day, weather permitting, so as to increase its yield. In bad weather, animals should be used to do the work. It is true that with the use of chain-track tractors and the tractors used in electroculture, the slipping of the wheels in wet soil is avoided.

Another point worth considering is that tractors do not give their full yield unless they are used with such implements as are suitable to them, which is not always the case.

For agricultural work other than ploughing, the full power of the tractor should be used so as to obtain the best yield. Thus, a 20-h.p. tractor hauling a single binder will not give a good yield; two or more binders should be hauled at once.

Similarly, light work is best done by draught animals. The tractor is not meant to do away with draught animals, but to do better than them, more quickly and cheaply, and where animal traction is obviously insufficient to attain the desired end.

These hints will be specially useful to agricultural groupings formed for mechanical cultivation.

1024—Trials of Disc-Harrows with Tractors in France.—RINGELMANN, M., in the *Bulletin de la Société d'Encouragement pour l'Industrie Nationale*, Year XCVII, Vol. CXXXIX, No. 2, pp. 313-319+8 Figs. Paris, March-April, 1918.

1028—The Use of Potato-Drying Plant in Rhodesia.—NOBBS, E. A., (Director of Agriculture), in *The Rhodesia Agricultural Journal*, Vol. XV, No. 2, pp. 126-135+2 Tables. Salisbury, Rhodesia, April, 1918.

Considering the possibilities of exporting Rhodesian potatoes to England and owing to the impossibility of sending fresh potatoes such long distances, the author advises that they should be dried and to that end describes two British systems together with the plant necessary. The first system, that of JAMES MILNE & Son, Ltd., Milton House Works, Edinburgh, who have supplied a number of potato-drying plants to the Food Production Department in England, consists in steam-cooking the washed potatoes and passing them, by a rough crushing process, over a special type of drying machine. They are washed in a canal, about 2 ft. wide, 2 ft. deep and about 100 ft. long, with a fall of less than 1%. A good flow of water enters with the potatoes and removes most of the sand and dirt. At the end of the canal is a grating through which the dirty water and sand escape, and the potatoes shoot down into a rotary washer with a horizontal shaft. This vat has 4 partitions with holes in each through which the potatoes pass, and revolving arms agitate them constantly in their transit from end to end of the machine. The washing is perfect and the potatoes leaving this machine are taken up a slope elevator and conveyor which distributes to hoppers over the cookers and drying machines. The cookers are arranged in duplicate over each drying machine. As the cooked potatoes emerge from the steaming vessels they are roughly crushed between small rollers, and then pass between 2 much larger steam-heated cylinders, which run practically in contact one with another; the film adhering to each cylinder dries in the course of about $\frac{1}{2}$ revolution, and is removed by sharp knives. The drying cylinders are worked at a pressure of about 80 to 90 lb. per sq. in., and require a very special mixture of iron to be sufficiently hard and yet strong enough to resist the pressure. The flake from the drying machines is milled and sifted to remove the peel, which commands a good price as a cattle feed. The cost of the plant when installed depends on the number of machines:—£1 500, £1 800, £2 200, £2 500 for 1, 2, 3, 4, machines respectively.

The yields depend on the content of dry matter; with 15% of dry matter in a season of 25 weeks of 60 hours each the yields for 1, 2, 3, 4, machines are 135, 270, 405, 540 tons of flour respectively and 34, 68, 102, 136 tons of peel respectively; with 25% of dry matter for the same season the yields of 1, 2, 3, 4, machines are 225, 450, 675, 900 tons of flour respectively and 56, 113, 170, 226 tons of peel respectively.

Figures are also given showing the cost of working 1, 2, 3 or 4 machines, which varies according to the cost of fuel, etc.

The second system, that of Messrs. L. LUMLEY & Co., Ltd., the Minorities, London, consists in evaporating the water of the potatoes in their "Invicta" fruit and vegetable dryer and evaporator, which is made in 5 sizes. It consists of a furnace for heating

air which passes through an inclined chest or frame filled with trays on which are laid the potatoes, fruit or vegetables to be treated. The greatest heat is concentrated upon a tray when it first enters the machine, and each tray subsequently introduced pushes the previous one into a lower temperature. The circulation of the hot, dry air ensures rapid desiccation of the outside, so that colour and flavour are unimpaired. By this process thin-sliced potatoes can be rapidly changed into a hard, light, dry form which will keep and bear freight to distant points for further manufacture or consumption.

Beside these systems the author says there are many others, duly protected by patents, such as those of H. G. BENJAMIN, New York, and the ALLIANCE VEGETABLE Co., Ltd., London.

1029—New Applications of Artificial Cold.

—FICHET, A., in *Le Genie Civil*, Year XXXVIII, Vol. LXXII, No. 22, pp. 396-399+9 Figs. Paris, June 1, 1918.

Owing to present-day needs the application of cold to industrial purposes has much increased, especially in the way of constructing cold-storage motor-vans and small cold-storage vehicles for the use of the armies in the field, for preserving vaccines, serums, meat, perishable food-stuffs, and recently the construction of new types of cold-storage trucks that are an improvement over those previously used. These different applications of cold have been made possible by the use of the AUDRIFFEN-SINGRUN refrigerator which is absolutely automatic, not requiring a mechanic to attend to it, as the machinery is enclosed in a hermetically sealed case.

This refrigerator consists of two hollow metal balls joined by a shaft whose end bears a pulley serving to give a rotatory movement. One ball acts as a freezer, the other as a condenser. These are placed on two tanks, one containing water and the other a non-freezing brine. When the apparatus is rotated the brine tank cools down while the water is warmed in the other tank owing to the compression. A stream of cold water is therefore necessary, as with all freezing machines, to maintain a suitable temperature in the condensing tank.

The ordinary freezing agents—ammonia, sulphurous anhydride, methyl chloride, etc.—can be used. A detailed description of how the machine works is given, the principle being that of most refrigerators:—liquefaction of a gas by compression and cooling and evaporation of the liquid thus obtained by decompression. Owing to its extreme simplicity the machine has been used by various of the French Ministries, especially for the production of pure ice near front-line hospitals, for troops in the field in the colonies, for preserving serums and vaccines, and for cold-storage transportation. The author describes all these applications in detail. The A-S refrigerator has been adopted by the American Army Transport Commis-

sion in France for the refrigerator wagons which are to be built, on account of its simple construction, which allows it to be left alone indefinitely without any fear of it going wrong or deteriorating. In the refrigerator wagons a small room is cut off from the length of the wagon by means of an interior wall. In this room a refrigerator of 3,000 "frigories-heure" (1) is installed with a pump and a small fan. The driving power is provided from the wagon axle. A governor prevents the speed exceeding a certain point which can be adjusted as required.

Six large brine pipes are fixed on the roof of the wagon of sufficient capacity to provide for refrigerating the wagon in case of a 12-hour stop. The fan distributes the air to assure a uniform temperature in all parts of the wagon.

The floor, roof and walls are insulated against heat by a covering of wood fibre and compressed cork slabs. To avoid too great changes of temperature, a thermostat acts on the salt pump, limiting its action when the temperature descends below +3°C. (37.4°F). A 10-ton wagon can carry some 8,800 lb. of goods. These wagons will be used for carrying meat and fruit from the south of France.

RURAL ECONOMICS.

1031—**Farm Management and Farm Profits on Irrigated Land in the Provo Area (Utah Lake Valley), U.S.A.**—CONNOR, L. G., in the *U. S. Department of Agriculture, Bulletin* No. 582 (Office of Farm Management), pp. 1-40. Washington, D. C., January 7, 1918. (8 pp. in Institute Bulletin.)

1032—**The Economic Results of the Overhead Irrigation of Strawberries in Illinois, U.S.A.**—ADRIAN, J., in *System on the Farm*. Vol. II, No. 4, pp. 134-135+1 Plate. Chicago, April, 1918.

In 1916, after having grown strawberries for 12 years without irrigation, the author installed an overhead irrigation system (1). The cost of installation was \$1,200 for 6 acres, or \$200 per acre. The water is derived from the municipal supply, and is charged for per cubic foot, the yearly cost of irrigation amounting to \$60 for the 6 acres. The average amount of water required for the whole area is 1,400,000 gallons a year. The irrigation pipes are placed in parallel lines 50 feet apart. This distance allows the water from two parallel pipes to meet in the middle.

All the field with the exception of 1 acre of autumn fruit, is planted with spring fruit, but, in time, the author intends to grow the autumn variety exclusively because of the greater profit obtained from it.

(1) The "frigorie-heure" represents the number of calories removed in cooling a body i. e., negative calories.

(2) See also Bulletin of Foreign Agricultural Intelligence, March 1915, No. 1090 and April 1916, No. 1330.

During 12 years the average receipts from strawberry growing without irrigation were \$188.56 per acre, and the average profit \$125.54. With overhead irrigation the average receipts per acre were \$542.86, and the average profits \$362.

AGRICULTURAL INDUSTRIES.

1035—**Decortication of Wheat Previous to Milling.**—LINDET, in *Comptes rendus des Seances de l'Academie d'Agriculture de France*, Vol. IV, No. 19, pp. 569-573. Paris, May 29, 1918.

1038—**The Utilisation of Paddy in Italy at the Present Day.**—NOVELLI, N., in *Il Giornale di Risicoltura*, Year VIII, No. 4, pp. 49-52. Vercelli. April 30, 1918.

1039—**Drying Vegetables.**—VERMOREL, in *Comptes rendus des Seances de l'Academie d'Agriculture de France*, Vol. IV, No. 20, p. 613. Paris, June 5, 1918.

The author emphasises the importance of the problem of drying vegetables; and points out that the temperature in nearly all the methods adopted is from 70 to 80° C. (158 to 176° F.). To avoid coagulation of the albuminoids the temperature should not exceed 40 to 42° C. (104 to 108° F.), or the dried vegetables become so hard that they are unfit for consumption.

1041—**The Manufacture of Paper Pulp from Dead Leaves.**—BRAMSON, K., in *Comptes rendus des Seances de l'Academie des Sciences*, Vol. CLVI, No. 21, pp. 853-854. Paris, May 27, 1918.

Each year in France there are from 35 to 40 million metric tons of dead leaves. To meet the country's paper requirement only 4 million tons would be necessary, which would, moreover, yield 2 million tons of useful by-products. It is easy to collect the leaves, and as they may be utilised throughout the year it is not necessary to store them. They could be transported in compressed form, but it would be better to instal works on the outskirts of the large forests where the raw material could be collected as required.

The process for making paper pulp from leaves is simple, rapid, and inexpensive. The leaves are crushed and then divided into two parts—the *veins* and *powder* (the blade falls into powder after crushing). The veins form the raw material for the pulp; they are steeped in lye for a short time, then washed and bleached, and the pulp is made.

The powder may be used as a fuel. It may be compressed into bricks with or without coal dust. Dry distillation, is, however, preferable. By this method is obtained a relatively pure (porous) fuel, rich in calories (6,500 to 7,000), and easily agglomerated. At the same time are obtained a tar (which has all the properties of Norwegian tar), acetone, and pyroligneous acid. The powder may also be used as a food for cattle for, as the fibrous parts of the leaf have been removed,

the assimilable, nutritive parts remain. The food value of this powder is almost equal to that of hay. Mixed with compressed molasses it gives a cake as good as that of hay.

The yield of 1,000 lb. of leaves is:—(1) 250 lb. of paper pulp; (2) 200 lb. of pure fuel (or 500 lb. of food powder); (3) 30 lb. of tar, 1 lb. of pyroligneous acid, 0.6 lb. of acetone.

1042—The Cotton Mill Industry of the World.—*The Indian Textile Journal*, Vol. XXVII, No. 319, p. 221. Bombay, April, 1917.

The consumption of cotton in the various countries of the world and the number of spindles in active use during the years 1901 and 1916 are given in the following table:—

	Cotton consumption Bales of 500 pounds gross Season of 1915-1916	Cotton spindles	
		1901	1916
United Kingdom.....	4,120,000	46,400,000	56,400,000
United States.....	7,325,000	20,080,000	33,000,000
Germany.....	800,000	8,140,000	11,750,000
Russia.....	2,070,000	7,900,000	8,100,000
France.....	1,025,000	5,700,000	7,800,000
India.....	2,040,000	5,000,000	6,850,000
Italy.....	900,000	2,000,000	5,000,000
Austria-Hungary.....	390,000	3,500,000	4,950,000
Spain.....	400,000	1,800,000	3,200,000
Japan.....	1,670,000	1,250,000	2,900,000
Brazil.....	325,000	400,000	1,500,000
Switzerland.....	90,000	1,300,000	1,500,000
China.....	2,525,000	200,000	1,250,000
Belgium.....	20,000	920,000	1,100,000
Canada.....	225,000	600,000	975,000
Scandinavia.....	169,000	400,000	850,000
Mexico.....	85,000	300,000	550,000
Holland.....	100,000	335,000	545,000
Portugal.....	60,000	230,000	480,000
Other countries.....	161,000	220,000	585,000
Total ..	24,500,000	107,395,000	149,785,000

1044—The Four Essential Factors in the Production of Milk of Low Bacterial Content.—AYERS, S. H., COOK, L. B. and CLEMMER, P. W. in the *U. S. Department of Agriculture, Bulletin No. 642*, pp. 61 + 28 Tables + 23 Figures + 6 Plates + Bibliography of 47 Publications. Washington, April, 1918.

This paper is a new contribution to the hygienic factors influencing the bacterial content of milk. The authors wished to confirm once more the necessity of observing the well-known sanitary rules (1) by supporting them by indisputable scientific data. They made several bacterial counts of milk taken under the following conditions:—(1) sterilised utensils; (2) clean cows with clean udders and teats; (3) small top pail.

The following data taken from the numerous tables given in the bulletin show the degree to which the cleanliness of milk is to be attributed to the observation of these principles.

1) STERILISED UTENSILS.—This is the factor with the greatest influence on the bacterial content of milk. Counts made from 60 samples of milk showed an average of 6,306 bacteria per cc. when the utensils were sterilised and 73,308 when they were not sterilised; the difference (67,002 bacteria) can, thus, only be attributed to the sterilisation of the utensils.

(1) See *Agricultural Gazette*, July 1918, page 741, No. 71.

2) WASHING THE UDDER AND TEATS.—When the animals and barn were kept clean the bacterial counts per cc. of 65 milk samples gave the following figures:—1) *udder and teats washed*, minimum 620 bacteria, maximum 5,400, average 2,154; 2) *udder and teats unwashed*, minimum 1,050, maximum 20,400 average 4,524.

3) SMALL TOP PAIL.—The small top pail is of the ordinary type with a fixed top leaving only a small semi-circular opening near the edge. Throughout the experiment milk taken in this pail always had a much lower bacterial content than that taken in an ordinary open milking-pail whatever the other conditions were. The maximum number of bacteria per cc. in the first case was 750,000, on the second, 1,200,000.

In order the better to control their results the authors combined the various factors in different ways. Data on the contamination of milk by faeces are also given.

Finally, the effect of temperature on the bacterial content of milk was observed. Counts were made of fresh milk kept at 4.4°, 10°, and 15.5° C. and 21.1° C. for 24 hours and 4 days. At the end of 96 hours the figures for the bacterial growth in all the samples tended to resemble each other. The optimum temperature is 10° C. or less.

The authors believe the three factors considered and the keeping of the milk at a temperature near 10° C. (50° F.) to be the most essential conditions for the production

of fresh milk with a low bacterial content, and that too much attention has often been given to other less important factors. Moreover, these conditions may easily be observed, even in medium-sized dairies.

1045—The Enzymes of Milk and Butter.—THATCHER, R. W. and DAHLBERG, A. C. in the *Journal of Agricultural Research*, Vol. XI, No. 9, pp. 437-450 + Bibliography of 27 Publications. Washington, November, 1917.

1046—The Deterioration of Condensed Milk; Estimation of its Acidity.—DUGARDIN, M., in *Annales de Chimie Analytique*, Vol. XXIII, No. 4, pp. 83-84 + 1 Table. Paris, April, 1918.

The present large demand for condensed milk has resulted in its being manufactured with increasing rapidity. If, however, sterilisation is imperfect the milk easily undergoes a fermentation which makes it unfit for consumption. To determine this deterioration it is sufficient to estimate the acidity.

The author estimated the acidity in several samples of condensed milk of different brands. The method used was as follows:—10 gm. of the sample are diluted in 25 cc. of tepid, distilled water (from which the CO₂ has been previously removed by boiling); titration with a decinormal solution of caustic soda, using phenolphthalein as an indicator; the acidity is expressed as lactic acid per 100 gm. of matter. The results showed that the normal acidity for sweetened unskimmed milks and for sweetened skimmed milks does not exceed 0.5 gm. An acidity between 0.5 and 0.75 gm. shows a deteriorated milk. Milk with an acidity above 0.75 gm. is unfit for consumption. In this last case the boxes bulge out very much, and the contents are violently expelled when they are opened. Unsweetened milks become clotted and are difficult to dissolve in water. Sweetened milks are solid and give off a disagreeable smell.

1047—Bacterial Precipitins and the Detection of *Bact. botulinus* in Preserved Foods by the Thermo-Precipitation Method.—BORNAND, M. (University of Lausanne and the Cantonal Laboratory of the Sanitary Service), in *Travaux de chimie alimentaire et d'hygiène publiés par le Service suisse de l'hygiène publique*, Vol. IX, Pt. 2 and 3, pp. 87-98. Berne, 1918. (2 pp. in *Institute Bulletin*.)

PLANT DISEASES.

1048—Researches on Apple-Spot Diseases.—BROOKS, C. and FISHER, D. F., in *The Journal of Agricultural Research*, Vol. XII, No. 3, pp. 109-137 + 10 Figs. + 4 Plates + Bibliography of 22 Publications, Washington, January 21, 1918.

The present paper deals with the effects of soil-water supply upon bitter-pit, Jonathan-spot and certain other non-parasitic spot

diseases of the apple (*Malus sylvestris*). It also includes notes upon the relation of the time of picking to the development of apple-spots in storage. The author's summary of the results is given below.

1) Bitter-pit and Jonathan-spot are to be distinguished from rosyaphis sigmonose drouthspot, cork, blister. Bitter-pit usually appears first as spots of dead, brown tissue in the sub-epidermal portion of the apple. These spots are associated with the terminal branches of the vascular bundles and in later stages of the disease the browning often follows the vasculars deep into the flesh of the apple. Rosy-aphis stigmonose is characterised by similar brown spots in the sub-epidermal region but the affected tissue is firmer than in the case of bitter-pit and there is no association with the vascular bundles. The early stages of Jonathan-spot are confined to the colour-bearing cells of the skin of the apple. Drouthspot is characterised by the checking of the growth at certain points on the apple without the production of any large quantity of corky tissue; fairly large areas of dead brown tissue usually occur near the surface of the apple, but sometimes are to be found deeper in the flesh; the spots are usually located in the blossom half of the fruit, which appears to be more susceptible after it is some one-third grown. Cork differs from the drouthspot in the presence of comparatively large spots of brown corky tissue, and in the fact that these are usually rather deeply seated in the flesh of the apple. Blister is a superficial lesion associated with cork and characterised by its blister-like appearance.

2) Drouthspot was produced by sudden and extreme drouth. It occurred on trees that were favourably located as well as on those that were growing under rather unfavourable soil conditions. Cork is apparently also a drouth effect, but it differs from drouthspot in the fact that its occurrence is usually associated with certain peculiar soil types.

3) Experiments have shown that there is a close relationship between the soil-water supply of the orchard and the development of bitter-pit in storage. Heavy irrigation greatly increased the disease, but not so much as medium irrigation followed by heavy irrigation. Light irrigation greatly reduced it, but heavy irrigation followed by light resulted in the lowest percentage of the disease. Sudden changes in the amount of soil-water apparently did not increase the disease.

4) Heavy irrigation may have been slightly favourable to the development of Jonathan-spot, but the contrasts were too slight to justify definite conclusions.

5) Large apples showed greater susceptibility to bitter-pit than small ones, but with Jonathan apples heavy irrigation increased the disease on the medium-sized fruit as well as on the large, and with Grimes the percentage of increase from heavy irrigation was even

greater on small apples than on large ones. Apparently, large apples are not susceptible to bitter-pit merely because they are large, but rather because of certain conditions under which they become large.

6) In 1915 there was more Jonathan-spot on the large apples than on the small ones, but in 1916 there seemed to be no correlation on between size of fruit and severity of disease.

7) During the first weeks of cellar storage more Jonathan-spot developed on apples that were picked early than on apples that were picked late, but with longer periods of storage these contrasts seemed to largely disappear. The results indicate, however, a greater susceptibility in the early-picked fruit.

8) Bitter-pit was worse on the Jonathan apples that were picked early than on those that were picked late.

1051—The Resistance of Manitoba Wheat to Fungous Diseases (1).—SCHRIBAUX, in the *Comptes rendus des séances de l'Académie d'Agriculture de France*, Vol. IV, No. 17, pp. 530-532. Paris, 1918.

In the spring of 1917, "Manitoba" and "Aurore" wheats were sown at the Grignon

(1) See *Agricultural Gazette*, July 1918, page 737, No. 34.

School of Agriculture by the side of "Japhet", "Bon Fermier" and "Saumur de printemps" for the purpose of studying their comparative resistance to fungous diseases.

The results are interesting, showing the superiority as regards their resistance to smut of the alternative wheats (Japhet and Bon Fermier) over the spring wheats (Saumur de printemps and Aurore) which, before Manitoba was introduced, were usually grown at the School. Thus, for 3 smutted ears of Bon Fermier and 16 of Japhet, sown on March 16, 1917, there were no less than 74 for Saumur de printemps.

For the same wheat the number of smutted ears increases as the sowing date gets later. Thus Saumur de printemps, sown on March 16, gave 74 smutted ears and when sown in the same soil a month later, on April 14 gave 157 or more than double.

Manitoba is remarkably resistant to smut and to fungous diseases in general. In the experiments in question, not a single smutted ear was seen either in the plots sown early (March 16) or in those sown late (April 26).

The author concludes that Manitoba wheat will probably be of great value to plant breeders for the creation of new wheats resistant to fungous diseases.

AGRICULTURAL ECONOMICS

INSURANCE AGAINST HAIL IN MONTANA

An Act passed on 14 March, 1917 has organized insurance against hail in Montana.

In the first place a State Board of Hail Insurance is created. It consists of the State Auditor and *ex officio* Commissioner of Insurance, the Commissioner of Agriculture and Publicity who is secretary of the Board, and three other members appointed by the governor from names submitted by the duly organized farmers societies having a membership throughout the State. This Board prepares a special form on which the purposes, scope and benefits of insurance against hail at the actual cost of the risk, as placed by this Act within the reach of all taxpayers, are explained in outline. Copies of this form are submitted by the County Assessor, when he makes the regular assessments of property, to each farmer in each county in the State who grows crops subject to injury by hail. Each farmer taxpayer indicates on the form he receives whether or not he wishes to become subject to the provisions of the Act. If such be his desire he fills in the form and files it in the office of the County Assessor no later than June 1, and thus he becomes liable to pay the tax on lands growing crops subject to injury or destruction by hail. This tax may not exceed 60 cents an acre on lands sown with grain crops or 25 cents an acre on lands sown with hay.

The County Treasurer in each county in the State keeps all monies he collects for hail insurance in a separate fund called the Hail Insurance Fund, which he remits to the State Treasurer no later than 31 December of the year in which the monies are collected. The State Treasurer places all the monies he receives under this Act to the credit of a fund called the State Hail Insurance Fund, whence he makes payments on warrants drawn by the State Auditor by order of the State Board of Hail Insurance. If such warrants be presented and there be no money in the fund to pay them they are registered and thereafter bear interest at the rate of 4 per cent. per annum until called for payment by the State Treasurer.

The owners of lands worked by others under lease or contract choose as to whether or not these lands are subjected to taxation under this Act. The lessee may, if the landowner do not thus subject them, pay the tax for insurance against hail in cash, whereupon his crops receive the protection afforded by the Act.

All losses by hail to crops insured under this Act are reported immediately by the owner of the crops, his agent or attorney, to the State Board of Hail Insurance, which requires the claimant to make a sworn statement as to the losses he has sustained,

their causes and other points of interest, on especially provided forms.

The Board of County Commissioners of each county in which a tax for insurance against hail is levied appoints two appraisers, nominating them from a list submitted by the duly organized farmers' societies. These two appraisers, together with a third chosen and appointed by the State Board of Hail Insurance, appraise all losses by hail in the county and report their findings to the State Board of Hail Insurance, which examines and verifies the reports and fixes the amount of losses.

When a loss by hail to crops insured under this Act has been sustained and its amount determined, the State Board of Hail Insurance certifies the fact and arranges for compensation. For this object it ascertains as early in each year as is practicable the acreage under hay and grain and subject to this Act on which the tax for insurance against hail has been levied. It thus discovers the total amount of such tax levied; and

it deducts thence 10 per cent. to allow for omissions of payments and cost of administration and appraisal, and then apportions the balance of the amount levied *pro rata* among all taxpayers subject to the Act who have incurred loss by hail, their losses having been estimated in the manner already described. The Board orders the State Auditor to issue warrants on the State Hail Insurance Fund as payment for such losses; but such payment may not exceed \$12 per acre in the case of grain and \$5 per acre in the case of hay crops.

Any taxpayer or association of taxpayers growing crops not specified in this Act, or other agricultural or horticultural products subject to injury by hail, may agree to accept the provisions of this Act and become subject thereto. The Board may then classify his risks and levy suitable payments from him, whereupon he acquires a right to the benefits and protection of insurance under the Act.

AGRICULTURAL STATISTICS

ACREAGE AND PRODUCTION OF FLAXSEED AND SUGARBEETS (1)

Countries	Area			Production		
	1918	1917	Five years' average 1912-16	1918	1917	Five years' average 1912-16
	Acres	Acres	Acres	Bushels	Bushels	Bushels
Flaxseed—						
Italy	42,000	44,000	44,000	335,000	332,000	350,000
Canada	1,068,000	920,000	1,156,000	5,972,000	5,934,000	13,044,000
United States	1,938,000	1,984,000	1,930,000	14,657,000	9,164,000	17,600,000
India	3,737,000	3,559,000	3,758,000	20,280,000	21,125,000	19,469,000
Totals	6,785,000	6,507,000	6,888,000	41,241,000	36,545,000	50,463,000
				Tons	Tons	Tons
Sugarbeets—						
Spain	150,000	146,000	100,000	1,460,000	923,000	..
Sweden	75,000	78,000	78,000	793,000	797,000	981,000
Canada	17,000	14,000	16,000	180,000	118,000	134,000
United States	592,000	665,000	579,000	5,823,000	5,980,000	5,972,000
Totals	834,000	903,000	773,000	8,256,000	7,818,000	..

(1) Tables showing the production of wheat and other cereals were given in the January number of the GAZETTE, pages 118 *et. seq.*

THE CROPS OF AUSTRIA-HUNGARY

According to information transmitted by the American Consul at Zurich under date of September 4 the wheat crop of Hungary is expected to yield 103,000,000 bushels compared with a pre-war five year average of 169,826,000, a reduction of 39.5%. This bears out the estimate of the crops of Belgium and the Central Empires in the article on "Food Prospects under Peace Conditions"

in the January number of the "Agricultural Gazette," when the 1918 cereal crops of these countries were estimated as being 40% less than the pre-war production. The corn crop is estimated at 157,000,000 bushels compared with a pre-war average of 194,000,000. The combined production of rye and barley is placed at 27,000,000 quintals against a pre-war average of 28,000,000

quintals or about 50,000,000 bushels of rye and 70,000,000 bushels of barley.

For Austria, the combined crops of wheat, rye and barley is given as 40,000,000 quintals compared with a pre-war average of 61,000,000 quintals, a reduction of 34.5%.

This would indicate that the 1918 wheat crop of Austria is 40,000,000 bushels against a pre-war average of 61,000,000 bushels, rye 72,000,000 bushels against 110,000,000, and barley 50,000,000 against 76,000,000.

BROOMHALL'S FOREIGN CROP SUMMARY, JANUARY 21, 1919

United Kingdom.—Wet weather has delayed ploughing and cultivation to some extent, but on the whole these operations have made fair progress. Threshing has also been hindered by the unsettled weather.

France.—Continued rains have caused some fears of crop damage to wheat. They have also delayed field work. The Government is taking active steps to bring under cultivation 4,000,000 acres in Northern France which have been liberated from German occupation, and it is hoped most of this land will be ready for sowing in the spring. Native wheat supplies are fair to liberal and it is again reported that there are larger offerings at central and western markets.

Italy.—Severe floods in the centre and north have been prejudicial to the new seedings. In the south sowings of wheat are

generally favourable, although in some sections the crop is not altogether satisfactory. It is feared that next year's outturn may be unfavourably affected by the scarcity of labour and fertilizers.

Spain.—Outlook for the new wheat crop is favourable. Seeding reports are generally good, prices are declining and supplies are liberal. The general position as regards foodstuffs is much more favourable than it has been for a long time.

Germany.—No information about the new crops is available, but expect that they are the same as in Austria-Hungary. Farm work has gone on more or less steadily in country districts, especially in those which are far distant from the big towns.

North Africa.—Beneficial rains are reported in Morocco and crop outlook is good.

THE 1918 CROPS OF CANADA

The final report of the 1918 crops of Canada gives the production of the different crops as follows: wheat 189,301,000 bushels compared with 233,743,000 in 1917; oats 380,274,000 compared with 403,010,000; barley 77,290,000 compared with 55,058,000;

rye 8,497,000 compared with 3,857,000, flax-seed 5,972,000 compared with 5,934,000; corn for husking 14,214,000 compared with 7,763,000; potatoes 104,513,000 compared with 79,892,000, and sugar beets 180,000 tons compared with 118,000.

LIVE STOCK STATISTICS

NEW ZEALAND

Number of live stock on January 31, in 1918 and in 1917.

Classification	Number		Increase (+) or decrease (-)	
	Jan. 31, 1918 provisional figures	Jan. 31, 1917 final figures	Differences	percentage (1917 = 100)
Horses	378,901	373,600	+ 5,301	+ 1.4
Cattle	2,888,214	2,575,230	+ 312,984	+ 12.2
Milch cows (productive or otherwise).....	797,569	777,439	+ 20,130	+ 2.6
Sheep.....	126,538,302	125,270,386	+ 1,267,916	+ 5.0
Pigs.....	258,269	283,770	- 25,501	- 9.0

IRELAND

Number of farm stock on June 1, 1918 and 1917.

Classification	Number		Increase (+) or decrease (-)	
	June 1, 1918	June 1, 1917	Differences	Percentages (1917=100)
Horses (including ponies)	618,807	597,692	+ 21,115	+ 3.5
Cattle	4,863,282	4,908,516	- 45,234	- 0.9
Sheep	3,627,173	3,744,453	- 117,275	- 3.1
Pigs	974,385	947,472	+ 26,913	+ 2.8
Goats	277,114	268,853	+ 8,261	+ 3.1
Poultry	24,424,230	22,245,024	+ 2,179,206	+ 9.8

NETHERLANDS

Census taken in August, 1918, compared with that of September, 1917 for horses, and with that of March-April, 1917 for cattle, sheep and pigs.

Classification	Number in		Increase (+) or decrease (-)	
	August, 1918	September and March-April, 1917	Differences	Percentages (1917=100)
Horses	378,204	337,818	+ 40,476	+ 12.0
Milch cows	1,108,902	1,234,594	- 125,692	- 10.2
Other cattle	939,970	1,066,938	- 126,968	- 11.8
Sheep	642,324	...	...	...
Pigs	600,133	1,185,438	- 585,305	- 49.4

UNITED STATES

Numbers of Live Stock on January 1, 1919 and January 1, 1918.

Classification	Number		Increase (+) or decrease (-)	
	Jan. 1, 1919	Jan. 1, 1918	Differences	Percentage (1917=100)
Horses	21,534,000	21,555,000	- 21,000	- 0.1
Milch cows	23,467,000	23,310,000	+ 157,000	+ 0.7
Other cattle	44,339,000	44,112,000	+ 227,000	+ 0.5
Sheep	49,863,000	48,603,000	+ 1,260,000	+ 2.6
Pigs	78,587,000	70,978,000	+ 4,609,000	+ 6.5

DAVID LUBIN, FOUNDER OF THE INTERNATIONAL INSTITUTE OF AGRICULTURE

BY T. K. DOHERTY, LL.B.

We have to record the death, about Jan. 1, of David Lubin, Delegate of the United States on the Permanent Committee of the International Institute of Agriculture at Rome. He had been ill for a number of years, but never abated his indefatigable activities in connection with the Institute. It was upon his initiative that, in 1905, the King of Italy, enthusiastically supported by the then Italian Minister of Foreign Affairs, Luigi Luzzatti, took the necessary steps to sound the attitude of the various European

Governments and bring about the Convention of 1908, which created the Institute. From that time until his death, Mr. Lubin continued to take a leading part in the deliberations, and has initiated in connection with the Institute some movements of international scope and interest. It was he who, through his educative campaign in the United States, brought about the visit to Europe, in 1913, of some 100 representatives of the various States of the Union and of several provinces of Canada, to study the systems

of European agricultural co-operation and agricultural co-operative credit. Upon their report an Act was passed by the U.S. Congress in 1916 providing for agricultural credit in the United States. A little later the Province of Saskatchewan introduced similar legislation.

Mr. Lubin determined the U.S. Congress to pass and President Wilson to sign, in 1914, a resolution aiming to bring about a series of treaties between all the nations for the purpose of steadying the world's price of the staples of agriculture. His plea was that the price of the world's staples was governed largely by ocean freight rates, and he presented elaborate arguments in support of their regulation by an International Commission in the nature of a deliberative, consultative and advisory body. The resolution which is to be submitted to the next Assembly of the International Institute, as approved by the U.S. Congress, reads as follows.

Resolution.—The General Assembly instructs the International Institute of Agriculture to invite the adhering Governments to participate in an international conference on the subject of steadying the world's price of staples.

This conference shall consist of members appointed by each of the Governments adhering to the Institute and is to consider the advisability of formulating a convention for the establishment of a permanent International Commerce Commission on merchant marine and on ocean freight rates with consultative, deliberative and advisory powers.

The chief clause of the tentative outline of the plan of procedure provides:

After the ratifications by the Governments of a treaty establishing the International Commerce Commission certain committees shall be appointed. Among them shall be (a) a Central Clearing Committee for Ocean Traffic; (b) a National Clearing Committee for Ocean Traffic in each of the adhering countries; and (c) a local Clearing Station for Ocean Traffic in each of the principal ports in the countries, all under the International Commerce Commission. The National Clearing Committee may work in their respective countries under the jurisdiction of such bodies as the Interstate Commerce Commission of the United States.

In Mr. Lubin's letter transmitting his proposal for the consideration of Congress, he stated that his communication was the "outgrowth of a series of meetings which he had recently held in London with leading British officials and ship owners." That very interesting document which is of considerable length, and preceded by a

personal sketch of Mr. Lubin by the well known author, H. G. Wells, was printed fully in the "Bulletin of Foreign Agricultural Intelligence" for December 16 (pp. 988-1009) and will be gladly sent to anyone who desires it.

In another notable document, published in 1917 by Mr. Lubin, is contained the outline of a plan for "An International Confederation of Democracies Under a Constitution." This is prefaced by some comments, reviews and opinions, chiefly of the ambassadors of the leading countries in Rome. The following one from His Excellency Sir Rennell Rodd, British Ambassador to Italy, is of particular interest at the present time:

"I have to thank you for sending me your exposition, in the Socratic method, of a scheme for an International Confederation of Democracies. It is the elaboration of an idea which I believe is gradually if vaguely forming itself in men's minds to-day, and you have carried it further by submitting a scheme for a constitution of federated Democracies.

"The more such a proposal can be ventilated and discussed the better. The reception generally accorded to President Wilson's views as to ultimate safeguards of future peace indicates that, if a practical scheme of application can be found, it will meet with general favour.

"One of the difficulties which seems to present itself is that any scheme for international confederation seems to connote a certain sacrifice of national individuality and individual interest, and that, in spite of the development of communications, of commercial intercourse, and of more intimate knowledge of each other among the peoples of the world, a tendency has been observable in recent years to emphasize rather than to weaken the spirit of nationality. A reluctance may therefore be anticipated on the part of some national units to renounce any avenue of individual development. The democratic spirit seems however to be the one common ground upon which nations may meet, and it has certainly hitherto tended to international sympathies and diminished international antagonisms.

"It seems possible that if the broad lines of common action to prevent aggression, patent or latent, could be laid down and accepted, many further beneficial developments might follow by a gradual process of evolution and the recognition of the advantageous results of such common action.

"In any case, the ideal which you have in view is worthy of all men's sympathy and serious study."

It was on June 24, 1918, only a few months before his death that he issued to the world his proposal for an "International Reserve Board"—"A Measure to Prevent Financial Panics and Crises on the Cessation of War." In this proposal his recommendation is based chiefly on the success of the banking currency law known in the United States as the Federal Reserve Act. Copies of these documents, viz. "International Confederation of Democracies" and "International Reserve Board" will be communicated to any reader who may be interested in these subjects.

David Lubin was a millionaire, very generous in his donations for philanthropic purposes and, it is generally understood, never made any charge for his services or expenses in connection with the Institute. He had a compelling quality of intense intellectual excitement which was one of the great factors in his personal activities. In his dealings with the other Delegates on the Permanent Committee this quality prevailed even against the strongest opposition and secured the adoption of his ideas. He was always intensely religious and frequently appealed to "The Rule of Righteousness." His structural idea was "the whole world as one state and com-

munity and God as the King of that State." When Mr. H. G. Wells in an interview confronted him with this idea, Mr. Lubin, in his usual intense excitement, cried: "But I see that. I have put my name to that. It is here." He struggled up, seized an Old Testament that lay on the side table and flung it upon the table. He stood over it and rapped its cover. "It is here," he said, looking more like Gladstone than ever, "It is here in the Prophets."

Mr. Lubin lived to witness the organization and successful working of the Institute which he had founded. He witnessed the adoption of his proposal for agricultural credit in the United States, the practical adoption by the allied countries during the war of his schemes for the control of ocean freight rates and for an "International Reserve Board."

The farming interests of the world have therefore to deplore in his death the loss of an exceptionally distinguished champion of their interests, and the whole world a distinguished friend of peace and good will among men. He stands out pre-eminently among the distinguished pioneers of such ideas, has shown the practicability of an international institution having a very wide scope, and has effectively paved the way for a league of nations.

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DEPARTMENT OF AGRICULTURE

The Agricultural Gazette of Canada

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THE AGRICULTURAL SHORT COURSES

BY W. B. VARLEY, ASSISTANT TO COMMISSIONER, AGRICULTURAL INSTRUCTION ACT

THE Ontario Agricultural Representatives' Short Courses or classes for young farmers, recently concluded, have, on the whole, been fairly well attended this year in spite of the prevailing influenza epidemic. These classes have been held annually for the past eight or ten years in some counties, each year at a different centre, so that they may be accessible to all. While designed to benefit any one engaged in farming, they make a special appeal to young farmers of from eighteen to twenty years of age, who have been out of school for some time, and who begin to feel the need for special instruction in matters connected with the business of farming.

Many Representatives report successful classes with marked interest being shown in spite of a somewhat general decrease in the numbers attending. Success, however, cannot always be inferred from the size of a class. One Representative instances this when he points out that, although his class was smaller than usual, every member was keenly interested, and that the results from such a class are of greater value than from a class where a large percentage attends from curiosity or a similar motive.

The classes are usually of four weeks duration, and are planned, in a general way, to meet—so far as the limitations of such classes will permit—the needs of young farmers for information on the theory of agriculture and its application to farm practice. They are designed, in the second place, to supply information on special practical subjects such as the gas engine and electricity as sources of power, milk-testing, co-operation and marketing, farm accounts, and farm management. In Brant, and some other counties, arithmetic and business correspondence, farm buildings, and sewage disposal were among the special features. The needs of a locality based on a careful study of local conditions, such as every representative must make in order to fit his activities to the sphere of his operations, are also kept in view and emphasized. Thus we find horticultural problems stressed in the Niagara and Lake Erie districts, dairying in central and eastern Ontario and the feeding of beef cattle in the beef sections, while, as would naturally be

anticipated, in a province such as Ontario, where general agriculture is chiefly followed, animal and field husbandry topics, such as stock judging and seed selection, are dealt with almost everywhere. To meet this situation, specialists in such subjects, the best that can be procured by the provincial Department of Agriculture, lend their assistance. These include not only men who are recognized as successful in their particular line of enterprise, but also representatives of the Dominion Department of Agriculture and of the Ontario Agricultural College staff.

An Agricultural Representative in one of the best counties of Ontario after some years of experience has concluded that boys attending short courses do not want technical or scientific addresses unless the speaker can give these without notes. He is firm in his conviction that a speaker who cannot remember the ideas he wishes to express is not likely to succeed in transferring what he has to say to the minds of his students. His suggestion to teachers of courses of this sort is that no notes whatever be used. Cut and dried speeches, this Representative observes, are very much out of order. When commencing his short course, this Representative, by a system of questions, makes a survey of the conditions surrounding the homes of the students and of the knowledge of the more important agricultural matters that the students possess. The answers that he receives are his guide in teaching the classes.

With the rapid development in the use of power on the farm, has come a desire on the part of those operating engines to learn more about their construction so as to employ them to better advantage. This is true not only of the gas engine, which is now being used for practically every purpose to which power can be applied on the farm, but also to the utilization of electrical power and the operation of tractors. To meet this particular demand, special courses were arranged

at several points in the province, as at Chatham, where a five day course was held in January in the theory and practice of mechanical farm Power, gasoline engines and tractors. In Ontario Haldimand and some other counties these subjects were also featured. No farmer in these days can afford to be without a knowledge of the information supplied by courses of this nature.

A motion picture outfit was employed to advantage in many instances, illustrating various agricultural operations, films prepared by the provincial agricultural department being used.

Every effort is made in these courses to keep the practical aspects prominently in view, and to illustrate the teaching by demonstration. A common practice is to spend the forenoon in lectures and discussions, and to give over the afternoon to visiting near-by stock farms for the purpose of judging cattle, horses, sheep, and swine, and in some of the counties near Toronto the classes were taken to the union stock yards, the parliament buildings and other places of interest in Toronto. From among those who show proficiency in stock-judging, a county team is selected to compete at the inter-county competition held at the Winter Fair in the Fall. Young men taking the course are also eligible for the acre-profit, steer-feeding, dairy profit, hog-feeding, and other competitions held under the auspices of the Junior Farmers' Improvement Associations, the winners receiving free transportation and living expenses while attending the two weeks' course in stock and seed-judging at the Ontario Agricultural College.

Another benefit derived from holding short courses is that the Representative comes in touch not only with those attending the course, but with the parents and also with various associations, such as farmers' clubs, township councils and agricultural societies. In this way the course affords opportunities for the

Representative to build a foundation for future work in the community.

The social influence of the classes is also a factor of value. Thus, the opportunity is taken advantage of by those living in the same county or district to become better acquainted. Continuing this idea, it is the custom in many instances, to hold at the conclusion of the course a supper or social reunion to which the students bring their friends and relatives.

The work is assisted by the grant made to the province under THE AGRICULTURAL INSTRUCTION ACT, and its value in influencing

agricultural standards in Ontario will readily be admitted. That the classes are doing their part in improving the agriculture of the country cannot be gainsaid. Perhaps the element of greater worth will be found in the awakening of the minds of many to the value of education in increasing power and usefulness, with greater satisfaction in life as the outcome. An evidence of this awakening will be recognized in the fact that quite a large number of the short course men are led to take the regular course at the Ontario Agricultural College.

LAND FOR SOLDIERS' SETTLEMENT

BY virtue of the War Measures Act and to facilitate the settling of soldiers upon land, an order in council has been passed providing for the purchase of farms and the settlement therefor. The provisions of the order just put into effect are briefly as follows:—

The Soldier Settlement Board is invested with authority and provided with funds for the purchase of lands suitable for immediate settlement by soldiers. They are also empowered to purchase stock, equipment, and building material for sale to settlers. Sales are to be at cost price to the Board. It is intention of the Board that as far as possible the soldier will select his own land, the price, of course, being subject to supervision by the Board. In every case as well, before the assistance of the Board in the purchase can be obtained, the soldier must pass a Qualification Council, at least one of which is established in every province, which Qualification Council determines whether or not the applicant is reasonably certain to succeed as a farmer. If the settler so qualifies and the land selected is deemed such as will enable him, by proper application, to earn for himself a living thereon and to pay for, the purchase is made through the assistance of the Board, the soldier being

asked to pay 10 per cent of the purchase price in cash. Not more than \$4,500 must be left outstanding and owing the Board at the time of sale. Provision is, however, made to cover cases of men who may not be able to pay the 10 per cent, but who have had already successful farming experience in Canada and who are otherwise qualified or equipped as to specially fit them as farmers. In these cases the whole or part of the 10 per cent may be dispensed with, and consequently a balance may be left owing by them up to \$5,000. The interest on the balance owing is to be 5 per cent, and all is to be repayable on the amortization plan by twenty-five annual instalments. The Board is also given authority to provide the soldiers with implements and stock up to a maximum value of \$2,000. It will be seen that this amount is \$500 above the figure that was some time ago estimated as the probable limit of advance for this purpose. Should the soldier have already implements and stock, but no cash, the matter can be adjusted with the Board. The advance for implements and stock is to be repayable in four annual instalments, commencing in the third year, there being no interest charged thereon for the first two years. A further assistance may

also be given the settler by way of an advance up to \$1,000 for permanent improvements, including the value of building material supplied. This advance is repayable on the same terms as the balance owing on the land.

While the amounts owing the Settlement Board remain unpaid the land and goods supplied are fully protected from seizure to the prejudice of the Board, nor can sales or charges be made without the Board's consent. The crops grown are protected from seizure to the extent of the obligations due the Board or to fall due within a reasonable time after seizure. Every care is taken that the soldier shall not be made the victim of aggressive or unscrupulous salesmanship and that the assistance intended for the soldier is not by one means or the other diverted to the enrichment of somebody else. It is felt that by making these provisions absolutely clear in advance no injustice will be done.

The terms of the law as now enacted are, as can readily be seen, such as to commit the Dominion to a very substantial outlay with regard to each man who qualifies as a settler under the Act. In the case of men who may become entitled to have the cash payment dispensed with, the commitment may run up to \$8,000; in the case of others, who will be, of course, the vast majority, the outlay may reach \$7,500. To

make the scheme a success, it is, therefore, imperatively necessary that the greatest possible care be taken not to encourage the settlement of men who are not likely to succeed. To do so will not only involve the country in loss, but would waste the time and energy of the settler. It is, therefore, hoped that the organization established will take care of this danger and will be such as to sift out the men whose knowledge, experience, and determination make them very probable successes as settlers in this country.

Every precaution is being taken to guard against improvident purchases. The Order in council does not provide for expropriation, as it was felt there would be no need of expropriation prior to the subject being dealt with by Parliament, but the bill that will be presented to the House will contain provisions for expropriation where the owner demands more than a fair price for his land. The expropriation provisions will, of course, apply to land not at present in use; that is, to wild land or to farms that are practically all wild land, withheld from production. Meantime the Board has every reason to be confident that there will be an abundance of land made available for purchase, at the most reasonable prices, to satisfy requirements until the statute is enacted.

SOLDIER TRADING AT EXPERIMENTAL STATIONS

ARRANGEMENTS have been made for giving agricultural instruction to returned soldiers at the Dominion Experimental Stations at Fredericton, N.B. and Lennoxville, Que. The Soldiers' Settlement Board will provide an instruction staff and such additional equipment as is necessary. The entire work, in each case, will be under the direction of the Superintendent of the

farm. This course will not interfere in any way with the regular experimental work being carried on at these branches of the Dominion Experimental Farms System. The work will be commenced as early as students are available and suitable instructors can be secured, and will be so directed as to qualify returned soldiers as farmers under the Soldiers' Land Settlement Act.

PART I

Dominion Department of Agriculture

THE EXPERIMENTAL FARMS

THE DIVISION OF BOTANY

POTATO INSPECTION SERVICE

BY PAUL A. MURPHY, B.A., A.R.C. SC. I., IN CHARGE OF POTATO DISEASE INVESTIGATION

ONE of the recent advances in our knowledge in connection with potatoes is the fact that the "running out" of seed, which has been known for perhaps a century and a half, has been found to be caused by one or more of a group of related diseases. The principal diseases of this class, and the

On the other hand it is comparatively easy to tell by an examination of the growing plant whether or not it is healthy, and whether the seed will be fit for planting or not. This is the principle underlying the inspection of potato fields during the growing season and the certification of seed which is based on it.



NO. 1. LEAF ROLL AND HEALTHY PLANT (*Irish Cobbler*) the diseased plant is dwarfed and the lower leaves are rolled

ones which are commonest in Canada, are leaf roll and mosaic, figures of which are shown. They are both carried and spread mainly by the seed, yet it has not been found possible to determine when a tuber is infected. The leaf roll seed shown in the figures is quite as desirable in appearance as the healthy seed beside it, but its yielding capacity is only about one third of the latter.

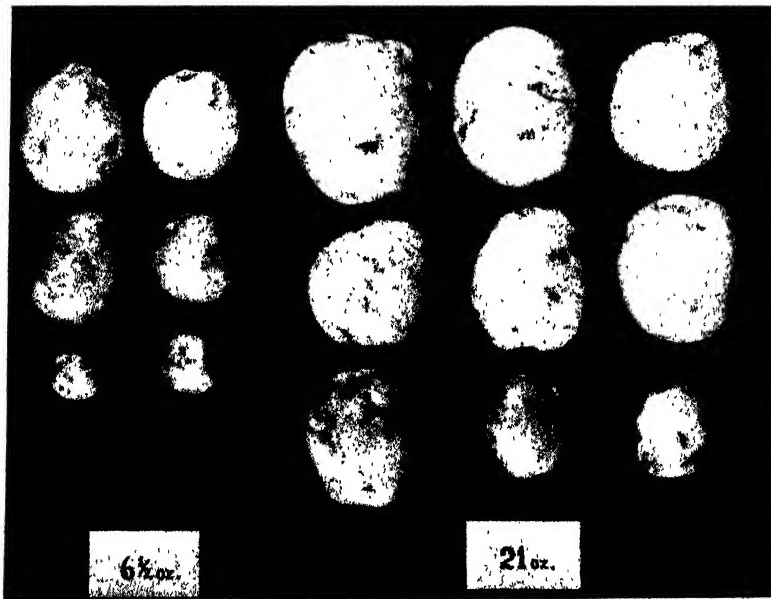
THE OBJECT AND NEED OF THE SERVICE

The principal object of the inspection service is, therefore, to discover and certify potatoes which are as nearly as possible free from the diseases mentioned. It is also the aim of the service to survey areas in which badly diseased potatoes are being planted in order to determine where

the most urgent need of good seed exists. The establishing of mutually beneficial relations between the seed-producing and the seed-using districts is left largely to other organizations, notably the provincial departments of agriculture. It is a pleasure to acknowledge in this connection the assistance given us by the Department of Agriculture of Ontario, without which the work could not have reached its present dimensions in that province; and also that afforded by the Department of Agriculture of New Brunswick.

7 per cent. It is to the presence of these diseases that the "running out" of the seed is to be attributed, and they are more responsible than any other single factor for the low average yield obtained. This is evident from the fact that every leaf roll plant gives only one third of a normal yield, while a mosaic plant yields about two thirds of the normal.

The only known means of overcoming these troubles is by the importation of disease-free seed from more favourable districts. In the case of Ontario the sources of supply



NO. 2. YIELD OF TWO PLANTS SHOWN ON PRECEDING PAGE

A glance at the present situation in Canada will reveal the need of this work. It has been known for some time that potatoes "run out" soon after being imported into considerable areas of Southern Ontario and Quebec. In a survey which covered 1,336 fields, comprising 2,339 acres, in 32 counties of this area in 1918, it was found, as was to have been expected, that the seed-borne diseases were very prevalent. The average amount of leaf roll in native seed was 15 per cent, and the corresponding figures for mosaic was almost

lie in the Maritime Provinces and Northern Ontario; in other words the Southern Ontario grower has to purchase a commodity, the most important character of which he has no means of judging, from a seller who lives perhaps one thousand miles away. It is here that the inspection service is able to step in and help both sides. Its certificate adds considerably to the value of the seed, but experience has shown that the buyer is very willing to pay extra for the privilege of being sure of what he buys.

BENEFIT TO THE SEED-GROWING DISTRICTS

It might be suggested that any seed purchased in the Maritime Provinces or in Northern Ontario would be so much superior to Southern Ontario seed that it might be used there with safety and profit. There are a number of growers who know to their loss that this is not the case. It is, in fact, surprising what an amount of diseased seed is prevalent in even the best districts, and how difficult it is to secure stock which is above suspicion. This point was brought out very clearly in an endeavour, which extended over several years and is now meeting with success, to furnish the new districts in Northern Ontario with foundation Green Mountain stock which was entirely free from mosaic. Cases are frequently met with in which potatoes running from 80 to practically 100 per cent mosaic are entered for certification for seed purposes. One instance is on record of a field being entered which contained 86 per cent of leaf roll.

An important benefit which has followed the work has been the

improvement in the seed used in the seed-producing sections themselves. There has followed from this a noticeable increase in production and marked benefit to the seed potato business. A trade in seed potatoes which the province of Nova Scotia has enjoyed with Bermuda for many years was on the point of being removed to Maine in 1914, on account of the prevalence of leaf roll. Desirable seed was procured by the American growers and trade connections were already established. The situation was taken in hand by the inspection service in 1915 and in two years the leaf roll was practically eliminated. The business, which is worth \$30,000 a year, is now entirely restored to Nova Scotia.

RESULTS AND METHODS OF INSPECTION IN 1918

The extent of the work in 1918 may be seen by reference to table I. Further space need not be devoted to it other than to say that none of the survey work carried out in Southern Ontario, Manitoba and Saskatchewan is included because no seed was certified in these places.

TABLE I.
RESULTS OF POTATO INSPECTION IN 1918

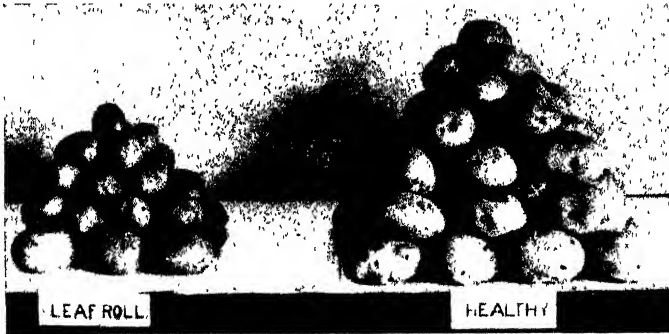
Province	No. of fields inspected	No. of acres inspected	No. of fields qualifying for No. 1 seed	No. of acres qualifying for No. 1 seed
P. E. Island.....	87	140	30	45
Nova Scotia.....	136	272	126	253
New Brunswick.....	2,206	7,584	516	1,759
Quebec.....	546	1,722	208	730
N. Ontario.....	313	278	109	131
Totals.....	3,288	9,996	989	2,920
Percentages.....	—	30.1	—	29.2

The inspection consists of visiting the fields in the months of July or August, when the exact state of the

crop is noted on appropriate forms. The principal information obtained at this time is the percentage of seed-

borne and other diseases present, particularly leaf-roll and mosaic. Other important data relate to the vigour of the crop and the percentage of mixtures.

are provided on request to allow one for each bag (or barrel) of the stock. The tags are consecutively numbered, and as a further means of placing responsibility on the grower, the



NO. 3. LEAF ROLL PLANTS PRODUCE GOOD POTATOES BUT THE YIELD IS ONLY ONE-THIRD OF THE NORMAL

A further examination is made, after digging, of those crops which reach the necessary standard in the field inspection. Attention is then

name and address of the latter and the year, are stamped on each one. In order to prevent trafficking in tags, they are not supplied until the



NO. 4. FOLDING-UP OF THE LOWER LEAVES IS CHARACTERISTIC OF LEAF ROLL (E. Ohio)

paid to tuber rots and blemishes, to the type of the potatoes, and to freedom from mixture with other varieties.

If the crop is found to be satisfactory a sufficient number of tags

grower is ready to ship. A certificate is given in the fall in cases in which it is desired to hold the potatoes until spring. This is later exchangeable for the requisite tags. As a further precaution tags are refused in all

cases in which the potatoes have changed hands before the final inspection.

The object of all this is to provide as reliable as possible a guarantee



TYPICAL UPRIGHT HABIT OF LEAF
ROLL IN MANY VARIETIES
(*Empire State*)

for the buyer who wishes to use this stock for seed. The inspection

standard printed on the back of each tag. It would be well for all who have occasion to purchase certified seed to remember that any defects in these respects are referable entirely to the grower, for it is a physical impossibility for the inspection service to examine all the potatoes while they are being loaded.

AMOUNT OF SEED PRODUCED AND ITS UTILITY

An estimate of the amount of seed certified must be incomplete at the present time as the work is not yet completed, particularly in New Brunswick and Quebec. This is true to an even greater extent of the amount of seed shipped from these provinces, because the bulk of the stock will not move until spring. An interim report on these matters is given below.



NO. 6. HEALTHY PLANTS (*left*) AND MOSAIC PLANT (*right*) (*Early Rose*) Note the smaller wrinkled and mottled leaves of the latter

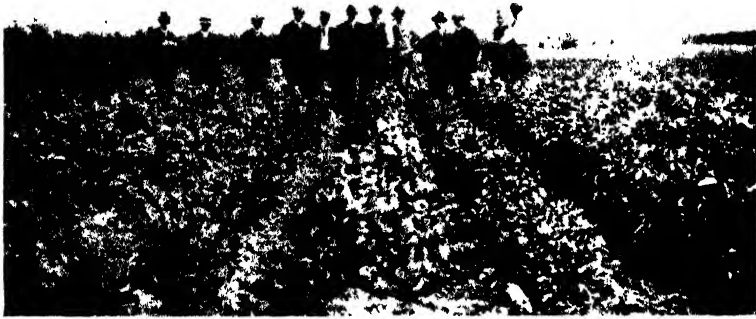
service takes all practicable steps to see that the potatoes sold under its tags are those which had been inspected in the field and after harvest and found fit for seed purposes. Beyond this it can assume no responsibility, and it seeks to place the onus on the shoulders of the grower, where it properly belongs. The grower when he accepts our tags, undertakes to use them only for the potatoes which have been passed, and to grade the stock up to the

Province	Amount of seed in bush.	
	Certified	Shipped
P. E. Island.....	3,255	1,800
Nova Scotia	50,000	30,000
New Brunswick and Quebec.....	65,000	1,000
N. Ontario..	16,000	10,700
Totals....	134,225	43,500

FUTURE PROSPECTS.

Seed potato inspection is a new undertaking and the work has been carried on not without difficulties and mistakes. It has taken time to reconcile the changes involved in the method of handling the seed with the customs of the trade, and the

may assume very grave proportions when the seed is planted somewhere else. As the work progresses, however, and further experience is accumulated it is found that large quantities of what may be called "pedigreed seed" are becoming available, the record of which is known for some years and the



Leaf Roll Row

Healthy Row

Leaf Roll Row

NO. 9. TRAINING INSPECTORS AT FREDERICTON, N. B.

reconciliation is not complete. The diseases being dealt with are also new, so far as our knowledge of them goes, and disturbing factors are being discovered as our experience widens. Thus climatic and other conditions are sometimes such as to make some of the diseases difficult to recognize in the field, and troubles which under one set of conditions appear negligible

future behaviour of which can be foretold without risk. This seed will in a brief period be more than sufficient to meet our pressing needs at home, and will provide an ever-growing surplus for profitable foreign trade. In the meantime the limitations of the early efforts of the service must be measured against its achievements.

CONCERNING SHIPMENTS OF CANADIAN POTATOES TO THE U.S.A.

WHILE there are no special restrictions now in force relating to the export of Canadian potatoes to the U.S.A., it would be well to bear in mind that only Canadian potatoes which come up to the standards or grades set for potatoes by the U.S. Department and the U.S. Food Administration, are accepted in the U.S.A.

These grades, according to which potatoes have hitherto been admitted into the U.S.A., and with which the Canadian exporters are quite familiar,

have been recently revised as stated below, with the more important changes printed in italics. The revised grade specifications became effective on and after February 10th, 1919.

U. S. GRADE NO. 1

This grade shall consist of sound potatoes of similar varietal characteristics, which are practically free (a) from dirt or other foreign matter, frost injury, sunburn, second growth,

growth cracks, cuts, scab, blight, soft rot, dry rot, and damage caused by disease, insects, or mechanical or other means.

The diameter (b) of potatoes of the round varieties shall be not less than one and seven-eighths ($1\frac{7}{8}$) inches, and of potatoes of the long varieties one and three-fourths ($1\frac{3}{4}$) inches.

In order to allow for variations incident to commercial grading and handling, five per centum by weight of any lot may be under the prescribed size, and, in addition, *six per centum* by weight of any such lot may be below the remaining requirements of this grade; but not more than *one-third* of such *six per centum*, that is to say not more than *two per centum* by weight of the entire lot, may have the flesh injured by soft rot (d).

U. S. GRADE NO. 2

This grade shall consist of potatoes of similar varietal characteristics which are practically free from frost injury and *soft rot*, and which are free from serious damage (c) caused by sunburn, cuts, scab, blight, dry rot, or other disease, insects, or mechanical or other means.

The diameter (b) of potatoes in this grade shall be not less than one and one-half ($1\frac{1}{2}$) inches.

In order to allow for variations incident to commercial grading and handling, five per centum by weight of any lot may be under the prescribed

size, and, in addition, *six per centum* by weight of any such lot may be below the remaining requirements of this grade; but not more than *one-third* of such *six per centum*, that is to say not more than *two per centum* by weight of the entire lot, may have the flesh injured by soft rot (d).

EXPLANATION OF GRADE REQUIREMENTS

(a) "Practically free" means that the appearance shall not be injured to an extent readily apparent upon casual examination of the lot, and that any damage from the causes mentioned can be removed by the ordinary processes of paring, without appreciable increase in waste over that which would occur if the potato were perfect. Loss of the outer skin (epidermis) only shall not be considered as any injury to the appearance.

(b) "Diameter" means the greatest dimension at right angles to the longitudinal axis.

(c) "Free from serious damage" means that any damage from the causes mentioned can be removed by the ordinary processes of paring without increase in waste of more than ten per centum by weight over that which would occur if the potato were perfect.

(d) "Soft rot" means a soft, mushy condition of the tissues, from whatever cause.

CHANGES IN ONTARIO DEPARTMENT OF AGRICULTURE.

The Ontario Department of Agriculture has undergone a change in its organization in which Dr. Geo. C. Creelman relinquishes the office of Commissioner of Agriculture and will give his full time to the work of the Agricultural College of which he is President. The office of Assistant Commissioner has been abolished. Mr. Justus Miller will devote his time largely in the capacity of Potato

Specialist. Mr. C. F. Bailey, Assistant Deputy Minister of Agriculture, has been given the title, Agricultural Commissioner and will continue to devote his services to the general supervision of agricultural representative work and of the agricultural work in Northern Ontario for the Department of Lands, Forests, and Mines.

DIVISION OF ECONOMIC FIBRE PRODUCTION

EXPERIMENTAL WORK ON FLAX FOR FIBRE

BY ROBT. J. HUTCHINSON, FLAX SPECIALIST

A COMPLETE experimental mill has been erected at the Central Farm, Ottawa. The mill is equipped largely with the machinery at present in use in flax mills but provisions have been made for the installation of new machinery in order to determine the efficiency and economy of some of the newer inventions that may come forward from time to time. It is also provided with a set of retting tanks. During the past season experimental plots of flax consisting of one acre each were grown in various parts of Canada. About 30 acres in all were grown in this way. Where possible flax was grown by farmers in the different provinces, the Experimental Farm providing the seed, the farmers undertaking to plough and prepare the seed bed, and harvest and team the crop to the nearest siding for \$45 per ton.

Trials have been made on both warm and cold water tank retting. Good fibre has already been obtained by the latter process, and it is intended to pay special attention to the former method with a view to the standardization of a process whereby fibre of good quality may be produced. Great attention is now being given to the grading of flax.

GRADING

The scutched flax should afterwards be sorted according to quality, the two principal grades being warp and weft.

Warp is generally broader fibre, stronger, and more ribbony flax, and the yarn spun from this is used by weavers for the warp or longitudinal threads of the cloth.

Weft is soft, more pliable flax, not necessarily so strong as warp, and is used for the yarn which goes in the shuttle running across the cloth, to fill it up.

In both warp and weft there are innumerable grades, and careful assortment is necessary in order to secure the full value of each quality of flax produced, because owing to the great variety of articles into which flax is manufactured there is a demand for many different qualities, and what suits one spinner may not always suit another. In sorting flax, water-retted (either pond or running water) must be kept entirely separate from dew-retted, and on no account should these classes be mixed in the bales. It has already been pointed out that they colour differently when the yarn made from them is boiled or bleached.

In judging flax, the principal qualities are:

- (1) Strength.
- (2) Weight or bulk.
- (3) Colour and uniformity.
- (4) Silkiness or oiliness.
- (5) Fineness and distinctness of separate fibres.
- (6) Length.
- (7) Cleanness.

CLASSIFICATION

A standard system of classification which has been instituted by the Experimental Farm, Ottawa, is as follows:

Water-retted qualities---

- W. P. A. Superior water-retted warp.
- W. P. B. Medium water-retted warp.
- W. P. C. Ordinary water-retted warp.
- W. T. A. Superior water-retted weft.
- W. T. B. Medium water-retted weft.
- W. T. C. Ordinary water-retted weft.

Dew-retted qualities---

- D. P. A. Superior dew-retted warp.
- D. P. B. Medium dew-retted warp.
- D. P. C. Ordinary dew-retted warp.
- D. T. A. Superior dew retted weft.
- D. T. B. Medium dew-retted weft.
- D. T. C. Ordinary dew-retted weft.

The agricultural side of the work is also receiving attention. Various field experiments have been carried out to exact efficacy. Under Canadian conditions of different artificial manures, variety of seed and system of cultivation, accurate records have been kept of these experiments and the cost of performing the various operations carefully calculated, the financial side of the investigation being obviously of great importance.

It would be useless now to issue part of these results as the majority of the varieties are just passing through in process of fibre separation. A special circular will be issued giving full details both on the retting, scutching and grading of flax fibre about the first of April.

A new process is now being tried out for the treating of the prairie flax straw. It may prove of great importance to the western farmer. Small experiments were made last summer. We had very good results. The fibre obtained from the straw had

almost the permanence of linen and a large spinning range. Binder twine with soft even surface, spun three-ply, gave 750 and 900 feet to the pound with a breaking strain of 60 and 50 pounds respectively.

The acreage under cultivation to flax last year in the west was, Saskatchewan 700,000 acres; Alberta 230,000 acres; Manitoba 63,000 acres. This million acres produced a general average of about one and a quarter tons of flax straw per acre, or a total of 1,250,000 tons. If the new process will produce 270 pounds of the finished article per ton of straw, then the potential value in binder twine of these waste piles of flax straw each year would equal 350,000,000 pounds. At only 15 cents per pound that would represent \$52,500,000 going up in smoke. We are trying a 400-ton lot of straw with this new process, and we hope to be able to have a full report on this experiment in the course of the next two or three months.

CATTLE FROM CANADA ENTERING OHIO

The government of the state of Ohio has enacted regulations governing dairy and breeding cattle (not intended for immediate slaughter) imported into that state from Canada. These regulations, which are now in effect, are as follows:

"All dairy and breeding cattle six months of age and over, coming into Ohio from the Dominion of Canada shall come in under quarantine of sixty days and shall be retested by this Department before being released, except cattle which have been tested by a veterinarian in the employ of the Bureau of Animal Industry, Washington, D.C., such test having been made within six weeks prior to the date of shipment.

In the shipment of cattle the owner must first obtain a permit from the Bureau of Live Stock Industry, Columbus, Ohio, and enclose an approved health certificate of the animal or animals intended for shipment into Ohio. If this health certificate indicates no reaction or doubtful reaction, they will be permitted to be shipped into Ohio subject to quarantine and a sixty day retest."

THE ENTOMOLOGICAL BRANCH

THE BALSAM INJURY IN QUEBEC AND ITS CONTROL

BY J. M. SWAINE, M. SC., DIVISION OF FOREST INSECTS

WE are beginning to realize at last that our Canadian forests are disappearing very rapidly, but very few, even among those of us familiar with our woods appreciate how fast this process has actually become. Fires, insects and fungi are the greatest enemies we have to deal with. The fire problem is rapidly being solved. The Forest Protection Associations of this Province are demonstrating how successfully co-operative measures can deal with such problems. The injuries by insects and fungi, on the other hand, have, until recently, been practically unrecognized. The actual conditions, however, indicate that these injuries are annually much greater in our forests than that caused by fires. We have a most disheartening example of combined insect and fungous destruction sweeping through the balsam forests of Eastern Canada at the present time. Upon hundreds of square miles of forest the balsam has been very seriously injured or killed within the last eight years, and on large areas of this practically all the balsam is already dead. The injury appears to be spreading rapidly in the balsam and a similar trouble is affecting the spruce in a much smaller degree. How far this is to spread we do not know, but certainly all balsam in infested forests is threatened with destruction. This subject is of the utmost importance to the lumbermen and provincial authorities of Eastern Canada and should receive immediate and very serious consideration.

It is my purpose to describe very briefly the causes, present status and probable future progress of this balsam injury in the province of Quebec and to suggest the only methods we have been able to devise for checking its further development.

The conditions in Ontario and the Maritime Provinces are somewhat different, but the suggestions with regard to slash disposal apply there with equal force.

About ten years ago an outbreak of the spruce budworm developed in the spruce and balsam forests in this province and rapidly spread throughout a large part of it. The injury was caused by a small brownish caterpillar which occurred in myriads and fed upon the foliage of spruce, balsam and hemlock. The adult stage of the insect is a small yellowish brown moth. The moths fly readily and can thus distribute the injury rapidly. This outbreak lasted only three or four years in most parts of the province of Quebec and then died away, so that the spruce budworm is not now an active agent in the present destruction of the timber.

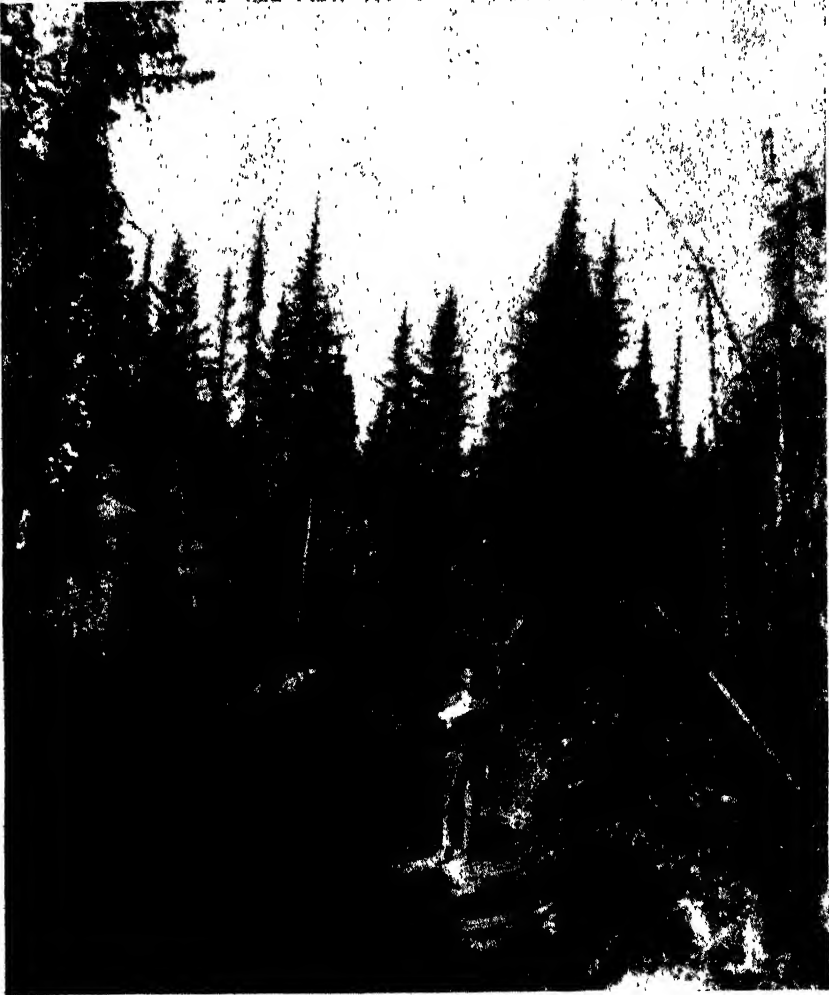
INJURY TO THE SPRUCE

The budworm affected spruce, balsam and hemlock. The injury to the hemlock we shall disregard. The spruce was severely affected but usually survived the attack. The caterpillars feed chiefly upon the buds and outer foliage on the spruce, particularly upon the upper part of the crown. And while the outer foliage is reddened and the trees may appear as though scorched, there is *usually* enough foliage left to carry the trees over the outbreak in fair condition. The injury to the spruce is, however, evidenced in two ways. If trees which have passed through an outbreak are cut, and the annual rings examined, it will be found that for the three or four years of the outbreak there was practically no growth at all. And, also, the many dead tops found on spruce during the last few years

were caused as a direct result of intensive defoliation of the apex of the crown by the budworms. Isolated spruces in a heavy balsam stand are frequently very seriously injured or killed outright. It may also be stated that during the past season we

INJURY TO THE BALSAM

The injury to the balsam was very much more severe. The caterpillars prefer the balsam foliage and occurred upon it in much greater numbers, so that the balsams were very badly



DYING BALSAM

have received reports of injury to spruce in Quebec province that indicate either important bark-beetle attacks or the incipient stages of troubles similar to those we now have in the balsam. The matter will be carefully investigated next summer.

defoliated over large areas. Thousands of trees were killed outright as a direct result of the budworm defoliation, and an infinitely larger number were so badly weakened that after the budworms disappeared it meant a desperate struggle for them to regain

normal health even though no other destructive agents attacked them in the meantime. A tree is like a human in this, that when it is weakened by

were attacked by four other destructive enemies, two parasitic fungi and two species of bark-boring beetles. The spruce budworm itself has caused



BALSAM AFFECTED BY HEART ROT



BALSAM BARK WEEVIL.
BLEEDING SPOTS ON BARK
OF A GREEN BALSAM

any one disease it is thereby rendered more susceptible to attack by any other distemper that may chance along. And it happened, unfortunately, that these weakened balsams

its injury and disappeared. It was the primary cause of this whole trouble, and while much of the timber weakened by its defoliation has died through lack of vitality, much of the

remainder has since been killed and is now being attacked by these four other enemies.

THE PRESENT ENEMIES OF THE BALSAM IN QUEBEC

The more destructive of the two fungi is the old-fashioned Ground Rot or Heart Rot, common in eastern balsam since the history of lumbering began. Although it has always been more or less common with us, it seems to me that it has simply run riot in our Quebec woods in these budworm injured balsams. The species is apparently *Polyporus schweinitzii*. It spreads through the root systems, and also through the air by spores borne on fruiting bodies formed above the ground. Injured trees die gradually from the bottom of the crown upwards, showing here and there dead branches, the foliage generally thin, and the trunk and branches bearing an abundant growth of pale green lichens or "moss." Trees showing these characters are almost invariably affected by the heart rot.

The second fungus we have called the Sap Rot. It appears as a white sheet of mycelium growing upwards over the roots between the bark and the wood. By the time it reaches and completely surrounds the base of the trunk the sap flow is entirely checked; the tree then dies rapidly and appears as a "red top." This disease is not nearly so common as the heart rot, but it is an enemy well worth watching.

The more destructive of the beetles is the Eastern Balsam Bark-beetle. This tiny, black, hard-shelled beetle, 2 mm. long, is abundant everywhere in the bark of balsam slash and in all dying balsams. Both beetles and their larvae cut their tunnels between the bark and sapwood and when they occur in immense numbers in living trees the sap flow is rapidly checked and the trees soon appear as red-tops. This has been the chief cause of the red-top balsams so common in this Province during the last ten years. It usually attacks dying bark and

weakened trees but when abundant will kill green timber. *Slash* and fire-killed trees form its great breeding ground.

The second beetle is a snout-beetle or weevil, which may be called the Eastern Balsam Weevil, one-third of an inch in length and greyish in colour. Its eggs are laid in the green or dying bark individually in groups of punctures. The punctures bleed and the balsam drying on the bark in whitish glistening patches betrays the disease. This injury is new to this Province. It was found to be spreading rapidly in green timber in some localities this summer, and will prove without doubt a serious enemy to the balsam.

PRESENT STATUS OF THE BALSAM DISEASE

The present condition of the balsam in relation to this injury appears to be serious enough. The disease is widely distributed east of the Saguenay river, but in some districts it has been particularly destructive, corresponding to the sections most heavily affected by the original spruce budworm outbreak. On some of these areas, extending over many square miles, from 20 to 50 or even 90 per cent of the balsam are already dead or badly diseased, and on parts of these areas the balsam has been almost entirely killed. The most extensive area of which we have knowledge covers the upper waters of the Coulonge and Black rivers and the country to the northward. On large sections of this country the balsam has been almost entirely destroyed and the reports indicate that the spruce is also becoming affected. The quantity of balsam already killed by this disease in Quebec Province is simply enormous.

WHAT IS THE OUTLOOK FOR THE FUTURE?

Doubtless many of the trees that have died during the last two or three years were too badly weakened by

the budworm to recover in any case, and had simply survived for a few years and finally died. It is therefore possible that the mortality in the balsam will not be so heavy in the future as it has recently been; but on the other hand there is an immense quantity of balsam barely struggling for life at the present time, and the four destructive agents I have already described certainly constitute a very serious menace. A careful consideration of the whole problem indicates that the balsam upon or near these diseased areas is threatened with destruction within the next few years; but how far the trouble will spread into districts not yet affected we do not know. And, in addition, the reproduction that will appear on these areas will be largely balsam, since most of the present stand is that species, and is likely to meet most unhappy conditions. With the ground, containing the roots and stumps, and also the standing timber rotten with fungi, and with the surrounding country infested by the destructive beetles, what chance will the young trees have to make good timber? The future of the balsam in the infested parts of this Province is certainly far from bright; and if there are any practical measures available for avoiding loss, checking the spread in new areas, and improving the conditions on the badly injured sections, they should certainly be employed without any further loss of time.

SUGGESTIONS FOR IMPROVING THE SITUATION

There is no panacea, no cure-all, for such a condition as this. The injury already covers such large areas and the mortality has been so high that only a great fire could properly clear this ground for the next crop. The balsam timber is so low in value that measures available when dealing with pine, spruce and Douglas fir are out of the question here. I have only three suggestions to make in regard to control measures.

(1) Utilize the Threatened Balsam. It is evident from what has just been said that the balsam upon the injured areas and also that near it should be utilized as rapidly as is commercially feasible in order to avoid total loss. It is possible that the diseased areas might be dealt with as burns are now treated as regards stumpage dues and diameter limit. The dying trees, like the fire-killed timber, are attacked by the large boring grubs, and the timber entirely riddled, at latest by the end of the second season following the death of the trees; so that prompt utilization is necessary, if the dying timber is to be saved.

(2) Burn the Slash.—There appears to be only one practical method by which we can hope to accomplish anything definite towards checking the spread of the disease, and that is by *burning the balsam slash*. *Slash-burning will not only check the injury in and near the diseased areas but it will greatly improve the conditions for the next crop.* Suppose, for example, that we have a limit of mixed balsam and spruce in fair condition, but that a few acres of the disease has developed on one side of it, where the budworm injury happened to be particularly severe. If the injury is neglected it is likely to spread in the surrounding timber. Suppose we log that part of the limit, cutting out all the diseased balsam and the remaining balsam and spruce down to the diameter limit, and then burn the slash on the snow. The result will be that we destroy practically all the destructive beetles on that area, since they are in the diseased and dying balsam bark, and also we get rid of the greater part of the fungus in the wood above the ground. In addition to that, we have destroyed the slash which would have been a prolific breeding ground for many beetles and fungi for several years. There would still be the fungus left in the roots and stumps, but that is apparently beyond our reach by any practical means. This method would certainly be effective in checking the

spread of the disease if the cutting were extensive enough to include all or nearly all of the injured timber. If many diseased trees were left, or if there were many others anywhere in the neighbourhood, the result would be less marked; although it would certainly be beneficial, and in proportion to the percentage of the diseased timber removed and burned.

In addition to the benefit to the standing timber, the destruction of the beetles and the fungi in the slash and the removal of the slash as a future breeding ground would materially improve conditions for the young growth which would follow the cutting. Now suppose that this method were carried out everywhere throughout the Province, consistently, as a definite policy, to the degree at least that all balsam slash were burned the winter it was cut. Is it not evident enough that the practice must have a marked effect in checking the balsam injury in the sections where the cuttings were made, and, what is of the greatest importance, *in preventing the development of the disease in areas not now affected?* It would do more than that. It would do away with a most dangerous breeding ground for destructive insects and fungi, reducing thereby the number of dying trees about old cuttings, and would help to give us a healthier reproduction. There is no doubt at all that any considerable quantity of balsam slash will constitute a serious danger to neighbouring balsam timber, even though the latter is still healthy, and this is particularly true for the next few years, which will determine how far this injury is to spread.

(3) Increase the Percentage of Spruce in the Stand.—A still better method in the example I used a few minutes ago would have been to *cut out absolutely all the balsam of pole size and over*, leaving on the ground only young balsam and the spruce below the diameter limit, and then to burn all the slash. I have read Mr. Hoffman's paper on the effect of seed trees on reproduction, and probably we

have all felt that his deductions are true for the eastern woods also. There can be little doubt that the reproduction that springs up must come mainly from the seed stored in the soil. But I still feel that if all balsam seed-trees were removed and spruce seed were falling each year, well scattered over the area, that the spruce seed would surely modify the following reproduction to a considerable degree, and give a higher percentage of spruce by the time the crop reached timber size. This question is of great importance and leads to the last point I wish to make. We have discovered in our studies of the budworm outbreak, particularly in the work in New Brunswick, where Mr. J. D. Tothill, of the Entomological Branch, has also been studying the balsam problem, that the sections carrying a high percentage of balsam were most heavily injured. In other words, the higher the percentage of balsam in the stand, the heavier the budworm injury has been to both balsam and spruce. If, then, we can affect the reproduction by any method of logging so as to give a higher percentage of spruce in the stand, by just so much we shall be insuring against serious injury from the next budworm outbreak: for other outbreaks will surely develop, at least in the lifetime of the next crop of balsam and spruce. If our foresters can devise any method of lumbering by which the percentage of spruce in the coming reproduction can be increased they will be obtaining two most important results, giving us more valuable wood as well as more healthy timber.

The argument in favour of burning pine and spruce slash is very nearly as strong, through similar reasons; but the practical difficulties in the way are, in this case, apparently somewhat greater, although probably not impossible of solution. If we could have an agreement between the Governments of Quebec, New Brunswick and Ontario, by which balsam and spruce slash from pulpwood cut-

tings should be burned each year everywhere throughout those provinces, I do not believe the lumberman's expense would be increased at all by the slash burning; the cost would be carried over to the consumer, where it properly belongs. Pine cuttings and spruce cuttings made chiefly for lumber require separate consideration, since the lumber must meet competition from southern and western forests. Even for this condition there are several solutions, one of which would be for the Provincial Governments to estimate the cost of burning the slash and to reduce the amount of the stumpage dues so as to reimburse the lumbermen for the part, or all, of the extra cost incurred by slash burning.

These are merely suggestions. The real problem is infinitely greater than costs. It is simply this: that our balsam forests are dying wholesale; that if the mortality continues to spread as rapidly in the next ten years as it has in the last ten we shall by that time have very little more balsam slash to burn, in Quebec Province at least. That is the great problem. If slash burning will help materially to check the trouble, and I have set forth here the reasons why

I believe it will, by all means let us burn the slash. As I see it now the question has come to be, not, "Shall we burn slash?" but, "How can we burn the slash to best advantage?"

Finally, slash is the garbage of the woods; and just as the city garbage must be destroyed to protect the health of the citizens, so should the forest garbage be burned for the protection of the trees. How can we expect the remaining timber to be healthy when each year we distribute throughout the Province many square miles of this rubbish, the finest breeding ground for insects and fungi that could possibly be conceived?

As a preventive and insurance against insect and fungus troubles the slash should always be burned; but at this time, when slash burning will without any doubt go far towards checking the balsam disease in regions where it has only started, and in preventing its development in areas that have thus far remained healthy, particularly at this time, when it is so essential that we find some method for fighting this disease, let us develop a way to utilize the only means that appears to be available, and *Burn the Garbage*.

INVESTIGATION OF MOSQUITOES IN THE LOWER FRASER VALLEY OF BRITISH COLUMBIA

BY C. GORDON HEWITT, D.SC., F.R.S.C., DOMINION ENTOMOLOGIST

FOR a number of years the Entomological Branch has been urged to undertake mosquito control measures in the Lower Fraser valley of British Columbia, where mosquitoes constitute a serious economic problem owing to their effect on agricultural and other operations which frequently have to be suspended, and on live stock. The Dominion Entomologist investigated the situation in September last and held conferences with representatives of the Boards of Trade and Municipalities in the affected region and with the Minister

of Agriculture for British Columbia to whom he later submitted recommendations for a definite policy for the control of mosquitoes in the Lower Fraser valley, where the affected region comprises an area measuring about 75 miles long and 30 miles broad at the widest point.

The Entomological Branch has agreed to be responsible for the entomological work required in connection with the carrying out of control measures and, in order to fulfil its obligations in this respect, arrangements have been made whereby Mr. Eric Hearle, B.S.A., of the

Ontario Agricultural College who, previous to undertaking military service in France had studied mosquitoes in Ontario, will carry on the necessary entomological work in connection with the problem under the direction of the Dominion Entomologist. For this purpose the Honorary Advisory Council for Scientific and Industrial Research has granted Mr. Hearle a studentship and the Entomological Branch will defray the expenses connected with the carrying on of the work. Mr. Hearle will commence work in the spring and will first undertake an analysis and survey of the mosquitoes breeding in the affected region, their habits, distribution and seasonal abundance, etc.

He will also advise the local authorities regarding any anti-mosquito measures that may be undertaken during the coming season.

It is understood that the Government of British Columbia proposes to introduce legislation for the purpose of enabling steps to be taken to carry out the necessary control measures. The permanent control of mosquitoes in the Lower Fraser valley depends mainly upon the development of unsettled land, which might form part of a land settlement scheme, and the prevention by means of drains and dykes of floods caused by the high water of the Fraser river in the spring and early summer.

THE FRUIT BRANCH

USE OF THE 6 AND 11 QUART WOOD VENEER BASKETS

BY C. W. BAXTER, FRUIT COMMISSIONER

THE recent amendments to the Inspection and Sale Act provide that on and after June 1, 1919, it shall be unlawful to use for the sale of fruit, any wood veneer baskets except those specified therein. The amendments further provide that manufacturers may make the old style baskets up to June 1; after that it will be unlawful for them to either manufacture or sell these.

Owing to the partial failure of the tender fruit crop in Ontario last year, there is a comparatively large quantity of the 6 and 11 quart baskets of the old specifications and of material for manufacturing these, in the hands of growers, shippers and basket manufacturers.

While it is in the general interests of all that the standard baskets be adopted as quickly as possible, it is desirable that this shall be done with as little loss as possible. Representations were accordingly made to the Honourable the Minister of Agriculture that the time for the use of the old style baskets (6 and 11 quarts)

be extended to December 31, 1919. The Minister has been pleased to grant this extension of time and it will therefore be permissible to use these baskets up to December 31 next. Growers and shippers will then be well advised when arranging for their supply of baskets for the coming season, to be careful not to purchase more than will be sufficient to meet their requirements.

The ministerial order follows:

"Under and by virtue of the authority conferred upon me by Section 326 of 'The Inspection and Sale Act' as re-enacted by 8-9, George V, Chap. 29, I do hereby order that notwithstanding anything in the above named section any person may until the 31st day of December, 1919, use eleven quart wood veneer fruit baskets and six quart wood veneer fruit baskets of the following dimensions, respectively:

"Five and three-fourths inches deep perpendicularly, eighteen and three-fourths inches in length, and eight inches in width at the top of

the basket, sixteen and three-fourths inches in length, and six and seven-eighths inches in width at the bottom of the basket; and

"Four and one-half inches deep perpendicularly, fifteen and three-eighths inches in length and seven inches in width at the top of the

basket, thirteen and one-half inches in length, and five and seven-eighths inches in width at the bottom of the basket;

"All measurements to be as nearly exactly as practicable and to be inside of the veneer proper and not to include the top band.

THE DAIRY AND COLD STORAGE BRANCH

PURCHASE OF FORAGE AND FLOUR FOR ACCOUNT OF IMPERIAL WAR OFFICE

BY J. A. RUDDICK, DAIRY AND COLD STORAGE COMMISSIONER

ALTHOUGH it is now generally known that during the war the Dairy and Cold Storage Branch of the Department of Agriculture handled a large volume of business for the Imperial War Office in the purchase, preparation, and shipment of hay, oats and flour for the use of the Expeditionary Forces in France and on other fighting fronts, it would appear to be desirable to place on record a full statement as to the quantities and values of the hay, oats, and flour thus dealt with.

HAY

The specification for the hay called for a bale to weigh 80 to 100 pounds of such density as to stow one ton in 85 cubic feet. In order to secure such high density it was necessary to erect compressors of special design constructed entirely of steel.

The C.P.R. Angus shops were commissioned to build 22 of these big machines, 18 of which were located in Harbour Sheds 24 and 25, Montreal. The others were used at outside points. Small plants were established for the winter of 1915-16 at Charlottetown, P.E.I., Calgary, Alta., and West St. John, N.B. In 1916-17 plants were established at Windsor, N.S., and Woodstock, N.B. The plant at Montreal was maintained at full capacity until the spring of 1917, when the War Office

intimated that no further quantities of hay would be required from Canada.

The hay shipments included 15,610 tons of Alberta timothy and 22 tons of upland hay ("prairie wool") from the same province.

The cost of re-compression, including every expense except interest on the cost of the plant, varied from about \$2.60 per ton in 1914-15 to \$3.50 in 1917, the cost increasing with the advance in wages and the prices paid for wire and other supplies. In addition to the actual cost of recompression there was a shrinkage in the weight of hay, due to waste, of about 2 per cent. Part of this was recovered in the sale of "scrap" hay.

All hay was carefully inspected as received at the recompressing plants and thousands of tons were rejected. There has not been a single complaint from the War Office as to the quality of the hay supplied.

OATS

In addition to hay, the War Office requested the Government, on the outbreak of war, to secure supplies of oats. The first purchases were made by the Board of Grain Commissioners, but in October, 1914, the oat business was also handed over to the Dairy and Cold Storage Commissioner. The requirements were

increased from time to time until the maximum of 60,000 tons per month was reached. All the oats except a few million bushels of bulk were shipped in 80-pound bags. This necessitated the purchase of nearly 30 million jute bags and the instalment of bagging machines by the elevators at Port McNicol, Midland, Port Colborne, Kingston, Montreal, and West St. John. The oats were purchased direct or through brokers as circumstances warranted. The profits on options, which were refunded to the War Office, amounted to many times the commissions paid to brokers.

FLOUR

In 1915 the War Office requested the Department to undertake the purchase of flour for army requirements, and this was added to other war work of the Dairy and Cold Storage Branch. A flour expert was sent out from London to assist. A specification was drawn up for a straight grade flour with limited moisture content, and all Canadian mills were invited to submit a sample to be the basis of future tenders of flour. The requirements during a period of 2 years were 20,000 tons monthly in 80 pound bags. Purchases were made from the mills offering the required quantity at the lowest price. All deliveries were tested for quality, moisture, and weight, and deductions were made for any failure to comply with the specification or contract.

When the Allied buying was organized in 1917, the purchase of flour and oats was taken over by the Wheat Export Company, and the War Office decided to take no more hay from Canada on account of the growing scarcity of tonnage.

The total quantities and values of the forage and flour purchased and shipped on War Office account, by the Dairy and Cold Storage Branch were as follows:—

	Tons	Value
Hay... . .	481,250	\$34,966,870.94
Oats	1,300,418	52,946,396.46
Flour... . .	492,391	11,655,780.23
Totals. . .	2,274,059	\$99,569,047.63

In other words, the shipment of oats amounted to 76,495,221 bushels and there were 12,309,776 eighty pound bags of flour. It required approximately 24,000,000 bushels of wheat to produce that quantity of flour.

The refunds to War Office account in connection with this business have reached the sum of \$903,706 18, consisting of marine and fire insurance collected, profits on oat options, shortages in oat cargoes, excess moisture and short weight of flour, scrap hay and scrap wire sold, etc., etc. A further amount of over \$80,000 was deducted from various accounts in settlement of claims for short weights, excess moisture, etc.

PURCHASES FOR THE UNITED STATES GOVERNMENT

When the United States entered the war the hay compressing plant at Montreal, which is unique on this continent, was idle. Its existence was brought to the attention of the Quartermaster General at Washington, with the result that he proposed that it should be utilized to re-compress Canadian hay for the United States Army in France. Arrangements were completed whereby the Dairy and Cold Storage Branch undertook to purchase the hay, have it recompressed and loaded on cars or steamers at cost price plus a charge of 50 cents per ton for the use of the compressors. The plant has been in operation ever since on behalf of the United States Government, and has thus made a market for a large quantity of Canadian hay at good prices. The total quantity

shipped to date (Feb. 15, 1919) is 162,225 tons, which, added to the War Office quantity makes a grand total of 643,475 tons.

The total cost of the hay compressing plants was \$125,568.11. Temporary buildings and part of the equipment used outside Montreal have been sold for \$7,574.59, and the charge of 50 cents per ton on

the hay for the U. S. Government now amounts to \$81,112.70. At the present rate of operation (over 1,000 tons daily) the total cost of the hay compressing plants will soon be wholly refunded to the War Office, and the Montreal plant of 18 compressors and other equipment will be that much to the good.

A BUTTER SCORING CONTEST

BY J. A. RUDDICK, DAIRY COMMISSIONER

REALIZING that Canadian butter makers as a class are at a disadvantage in trying to reach uniform standards, by being widely separated, it has been decided that this Branch shall conduct, during the season of 1919 an educational butter scoring contest in which the different provinces are invited to participate, through the provincial dairy officials. The contest will be conducted according to the following rules :

1. Four 14 lb. boxes of butter, each from a different creamery, to be forwarded from all the provinces participating, to arrive at Montreal between the 5th and 10th of each month, April to October inclusive.

2. Full details as to the handling of the cream and manufacture of the butter to be given on forms provided for that purpose by the Dairy Commissioner, Ottawa.

3. The butter will be scored on its arrival at Montreal and then placed in cold storage for re-scoring, by the same judges, once a month throughout the season.

4. The percentages of salt and moisture

will be determined in each sample and a test made with the Storch test.

5. Reports of the scorings, re-scorings and other tests will be sent to all participants every month.

6. The Dominion Dairy Branch will pay for the butter at market prices, on receipt of proper invoices, and will also pay the express and storage charges.

The detailed information as to the methods followed in handling the cream and in making the butter, together with the results of the monthly scorings, should be of great educational value to buttermakers and dairy instructors throughout Canada, and should assist materially in securing uniformity of quality and character, and also in standardizing the methods and practices followed in the buttermaking industry.

The samples will be used during the following winter for demonstration purposes at the dairy conventions, for educational work in the dairy schools, and for conferences of graders from the different provinces.

The all-round teacher should know, and teach something of, sewing, cooking, designing, domestic sanitation, chemistry of foods, symptoms of common diseases, poultry, farm accounts, horticulture, dairying, economic insects, architecture, fertilizers, field crops, animal husbandry, soil and plant life. She should be proficient in home economy, including the canning, drying, salting and preserving of fruits and vegetables. L. A. DeWolfe, B.A. Director, Rural Science Schools, Truro, in *The Rural Science Bulletin*.

PART II

Provincial Departments of Agriculture

PRIZES AND SCHOLARSHIPS OFFERED BY AGRICULTURAL COLLEGES

PROVISION is made by Departments of Agriculture, public spirited individuals and business institutions for the awarding of grants, prizes and scholarships to students that show special merit, and for other considerations. The following statements represent the awards provided for students attending the Agricultural Colleges in Canada:

NOVA SCOTIA

At the Nova Scotia Agricultural College, the following prizes are awarded:—

- Highest standing in the
Senior year.....Governor General's
Silver Medal.
- Highest standing in live
stock judging, open to
all students.....Premier Murray's
Cup.
- Highest standing in seed
judging, open to all
students Cup presented by
Prince Edward
Island Students.

From year to year incidental prizes are offered.

QUEBEC

GRANTS

The Department of Agriculture of the Province of Quebec grants to each student belonging to the Province of Quebec attending the School of Agriculture, Macdonald College, and employed in studying according to the time tables, \$7.00 per month of attendance. This amount is placed to the credit of such student by the college bursar, and is applied on account of board and lodging.

The Department also grants to students belonging to the farming community of the province, in the junior and senior years, a bursary ranging from \$20.00 but not exceeding \$50.00 each.

PRIZES

His Excellency, the Governor General of Canada, will donate a bronze medal to be awarded to the second-year student who ranks highest in general proficiency in first and second year work.

Sir Edward D. Stern, Fan Court, Chertsey, Surrey, England, has donated a silver challenge cup, which is held for one year by the student who makes the highest aggregate in stock judging in the final year.

Mr. Garnet H. Cutler, Professor of Cereal Husbandry in the University of Alberta, the first lecturer in Cereal Husbandry, Macdonald College, has donated a bronze challenge shield, which is held for one year by the student who makes the highest aggregate in the cereal husbandry option in the final year.

The Canadian Manufacturers' Association will donate two cash prizes of \$35 and \$15 respectively for competition among the undergraduates of the school of agriculture. These prizes will be known as the "Industrial Canada" prizes, and will be awarded for the first and second best essays on a subject to be chosen by each competitor from amongst four selected by the faculty, and approved by the Canadian Manufacturers' Association.

The Minister of Agriculture for the Province of Quebec has offered a prize of the value of \$10.00 for the fourth year student who takes the highest standing in the horticultural option.

ONTARIO

SCHOLARSHIPS

Four Scholarships of \$20.00 each will be awarded on first year work, theory and practice, and will be paid as follows: \$10.00 in September, and \$10.00 in January of the following academic year on condition that the winner takes the second year work as required for the Associate Diploma.

The awards will be made on the following groups of subjects:

Group 1—English,
Mathematics.

Group 2.—Animal Husbandry,
Dairying,
Field Husbandry,
Veterinary Science.

Group 3.—Botany,
Chemistry,
Geology,
Manual Training,
Physics,
Zoology.

Group 4.—Apiculture,
Horticulture,
Poultry.

To obtain one of these scholarships, the candidates must take 40 per cent of the marks for each subject in the year's work, and 75 per cent of the aggregate number of marks allotted to the subjects in the group.

No student shall receive more than one of these scholarships. If two or more scholarships are won by one student, or if any scholarship or portion of a scholarship is not awarded or paid on account of non-attendance or other causes, it may be awarded to the student who stands next highest in that or any other group, providing he complies with the conditions laid down in the preceding paragraph.

Mr. George Chapman, of Guelph, has generously offered the sum of twenty dollars (\$20.00), to be expended in books, as a prize in English. This prize is to be awarded on the work in English of the first two years. The three divisions of the work under the English department will be taken into consideration in awarding the prize, namely:—English literature, English Composition and Public Speaking. The prize will be awarded to the student whom in the judgment of the committee, is the best all-round man in English.

The Canadian Manufacturers' Association has offered the following prizes for essays written by undergraduates of this College:—First, \$50.00; second, \$30.00 and third, \$20.00.

The following are the conditions under which the essays are to be written:

The Faculty of the College shall select not less than four subjects, and shall submit them to the Executive Council of the Manufacturers' Association not later than September 15th each year. The committee will approve and return them on November 1st, on which date they may be announced.

The essays shall be submitted to the Faculty of the College by February 1st, shall be judged by the Faculty, and the awards made not later than March 15th, after which the prize-winning essays shall be forwarded immediately to "Industrial Canada" and shall become the property of that publication.

Essays shall be approximately 3,500 words in length.

Those entering the competition for "Industrial Canada" Scholarships must be enrolled as undergraduates.

No awards shall be made unless the faculty is satisfied the publication of the prize-

winning essay will reflect credit on the college.

The '05 Scholarship, fifty dollars in gold, has been established by the graduating class of 1905 to replace the '05 gold medal. It will be awarded to the student of the Third year, who, by vote of a committee consisting of the President of the college and the '05 members of the college staff, is considered to be the best "all-round" man in his year, and through activity in all branches of college life as, well as proficiency in Scholarship during his course, has done most for the college, for his fellow students and for himself. The award will be made toward the end of the Third Year.

PRIZES

Three prizes of the value of \$10.00 each in books, to be selected by the winner, will be given as follows:

One to the second year student who shall compose the best essay submitted for second year thesis.

N.B.—Thesis subjects are chosen by the students, but must be approved by the President.

One to the student who shall stand first in general proficiency on first and second year work, theory and practice.

One to the student who shall rank highest in general proficiency and shall obtain first-class honors in his major subjects in the fourth year.

MEDALS

A silver medal is awarded each year by the Governor General of Canada to the second year student who has ranked highest in general proficiency in first and second year work.

MANITOBA

SCHOLARSHIPS AND PRIZES

Isbester Scholarships

For Highest general Proficiency.

- (a) Third year Agriculture, \$60.00.
- (b) Third year Home Economics, \$60.00
- (c) Fourth year, Agriculture, Field and Animal Husbandry Course, \$100.00.
- (d) Fourth year, Home Economics, \$100.00. The highest aggregate on subjects common to both options will be taken in awarding (d).

The Governor General's Medal

His Excellency the Duke of Devonshire will give a medal to the student standing first in general proficiency in his second year.

The Lieutenant-Governor's Medal

His Honor, Sir James Aikins will give a medal to the student standing first in general proficiency in his fifth year.

WESTERN RETAIL LUMBERMEN'S ASSOCIATION PRIZES

The Western Retail Lumbermen's Association is giving \$100 in cash prizes for a House Plan Competition, to be open to all students of the College. Either city or farm house plans will be accepted. A prize of \$15 will be given for each of the six best plans submitted. The two best sets of drawings among the prize plans will be awarded \$5 each.

INDUSTRIAL CANADA SCHOLARSHIP

Industrial Canada offers a cash prize of \$50 for competition among the undergraduates of the M.A.C. It is to be awarded for the best essay written on any one of six subjects, to be submitted on November 1, 1918. The essays must be ready for examination by June 1, 1919, and be approximately 3,500 words in length.

THE LOUDEN HARDWARE CASH PRIZES

The Louden Hardware Specialty Company renew their annual offer of \$35 in cash prizes for the best general purpose barn plans; competitors to submit plans by January 15.

SWIFT CANADIAN COMPANY CASH PRIZE

The Swift Canadian Company will give a scholarship of \$25 to the student taking the highest grade in the work in Animal Husbandry of the fourth year.

THE OGILVIE FLOUR MILLS COMPANY CASH PRIZES

This scholarship of \$50 will be awarded in three cash prizes of \$25, \$15 and \$10, to the students obtaining highest general proficiency standing in first year.

PUBLIC-SPEAKING PRIZES

The '11 Graduating Class Cup and Union Literary Society medal are awarded for first place in public-speaking contest.

INTERNATIONAL HARVESTER COMPANY PRIZE

The International Harvester Company of Canada offers a one horse-power "Tom Thumb" gasoline engine to the student attaining the highest standing in the agricultural engineering subjects taught in the first year wood-shop, forge-shop and gasoline engine work.

HUGHES-OWENS COMPANY PRIZE.

The Hughes-Owens Company will give a white edge scale, celluloid T. square and a drawing board to the student who makes the highest standing in third year drawing.

PRIZES IN HOME ECONOMICS

The Board of Directors will give prizes to the students obtaining first and second places in general proficiency in both years of Homemaker course.

For the purpose of encouraging debating among the young women students, Mr. W. G. Fraser has donated a cup to be competed for each year in the Home Economics Inter-Class Debating series.

Another friend of the College will present each student debating for the winning year with a set of Pyrex or a dozen stainless knives.

The 1916 class in Agriculture have donated a cup for competition in the Second Year Home Economics class. The cup is given for the best two loaves of bread and the best afternoon dress made by the student of the class. The name of the winner will be inscribed on the plate at the base of the cup. The prize will be presented at the re-union in February.

Two cash prizes of \$10 each will be given for the best work in sewing of First Year.

No student will be eligible for a general proficiency prize who is conditioned in any subject, or who has not written on all subjects in the same year.

SASKATCHEWAN

SCHOLARSHIPS

A scholarship of \$100 is offered by Mr. John Dixon for competition among the students of the second year of the Associate Course in Agriculture.

A University Scholarship of the annual value of \$30 (free tuition) is offered for competition among the students of the first year in the degree course. A similar scholarship is offered for the students of the second year.

The Walter Scott Scholarship of the value of \$50, will be awarded each year to the most distinguished member of the graduating class in the degree course, provided a sufficiently high standard has been attained.

ALBERTA

The following prize is awarded by the College of Agriculture, University of Alberta:

THE GOVERNOR GENERAL'S MEDAL

A gold medal offered by His Royal Highness, the Duke of Connaught is to be awarded each year to the student who takes the highest standing in the last two years of the work in the Faculty of Agriculture.

PRIZES

The following prizes are offered for competition for the Session 1918-1919.

The P. Burns Prize of \$50, offered by P. Burns, Esq., of Calgary, for competition in the Department of Agriculture at the Olds School.

The P. Burns Prize of \$50, offered by P. Burns, Esq., of Calgary for competition in the Department of Household Science at the Olds School.

The Swift Canadian Company Prize of \$25, offered by the Swift Canadian Company, for competition in the Senior Year in Animal Husbandry at the Vermilion School.

The Western Retail Lumbermen's Association Prize of \$25, offered by the Western Retail Lumbermen's Association, for competition in the Department of Household Science at Claresholm School for the best design of house, barn and farm buildings.

The Western Retail Lumbermen's Association Prize of \$25, offered by the Western Retail Lumbermen's Association, for competition in the Department of Household Science at the Claresholm School, for the best design of a farm kitchen.

The Western Retail Lumbermen's Association Prize of \$25, offered by the Western Retail Lumbermen's Association, for competition in the Department of Farm Mechanics at the Vermilion School, for the best design of house, barn and farm buildings.

The Western Retail Lumbermen's Association Prize of \$25, offered by the Western Retail Lumbermen's Association, for competition in the Department of Household Science at the Vermilion School, for the best design of a farm kitchen.

The Hayward Lumber Company Prize of \$50, offered by the Hayward Lumber Company, for competition at the Vermilion School, for the best bushel of alfalfa seed grown by a student during 1918.

The Crown Lumber Company Prize of \$50, offered by the Crown Lumber Company for competition at the Claresholm School, for the best bushel of alfalfa seed grown by a student during 1919.

The Atlas Lumber Company Prize of \$50, offered by the Atlas Lumber Company, for competition at the Claresholm School, for the best bushel of alfalfa seed grown by a student during 1919.

The Edmonton City Dairy Prize of \$25 each to the Vermilion and Olds Schools of Agriculture for general proficiency in dairy work at the School, together with an article on the sanitary production of milk.

The Carlyle Dairy Co., Ltd., of Calgary, Prize of \$25, to the Claresholm School of Agriculture, for general proficiency in dairy work at the School, together with an article on the sanitary production of milk.

The Collicutt Cup, value \$100, offered by Frank Collicutt, Esq., Calgary, for competition in stock judging by teams of three boys from the Senior Year in the Schools. Possession follows two successive wins.

BRITISH COLUMBIA

SCHOLARSHIPS

A scholarship in Agriculture of \$75 will be awarded to a student proceeding to the second year, the award to be based on the work of the first year.

Two book prizes of the value of \$25 each open to all students of the university, will be awarded for essays on special subjects, one literary and one historical or economic, to be announced at the beginning of the session.

NOVA SCOTIA

AGRICULTURAL ACTIVITIES

BY J. G. ARCHIBALD, B. S. A., DEPARTMENT OF CHEMISTRY

DAIRY COURSES

The Maritime Dairy School will be held at the Agricultural College from March 12th to April 3rd. All of the instructors this year are Maritime Province men. The following courses are announced:

Buttermaking—March 12th to 25th.

Instructor—R. B. McLellan,
Brookfield, N.S.

Cheesemaking—March 26th to April 3rd.

THE annual Short Course at the Agricultural College, which in other years has been held the first two weeks of January, has been postponed on account of influenza until March. It will be held from March 5th to 13th inclusive. This annual feature of the work of the College has always been much appreciated by the public as evidenced by the average attendance, which for the fifteen years of its existence has been around three hundred.

Instructor—H. W. Coleman,
Dairy Supt. Province of N.B.
Milk Testing—March 26th to
April 3rd.

Instructors—Ben Gallant, Dairy
Inspector, Province of N.B.
Harry R. Brown, Truro, N.S.

Mr. W. A. McKay, Superintendent
of Dairying in this province, is in
charge of the school.

In connection with the growth of
the dairy industry in Nova Scotia,
it is interesting to note that the
government creameries on Cape
Breton Island are this year running
all winter for the first time.

SHEEP PROTECTION

This year the Provincial Act for
sheep protection, which provides for
compulsory taxation of every dog to
the extent of one dollar, and every
bitch to the extent of five dollars,
comes into force. It will be inter-
esting to watch the results of this
piece of legislation. Besides com-
pulsory taxation the act provides an
indemnifying fund for damages for
sheep destroyed by dogs, the owners
of which are either not known or are
too poor to pay.

WHITE VS. RED POTATOES

The potatoes which have always
commanded the highest price in our

markets are white varieties, of the
Green Mountain or Irish Cobbler
type. Rot has always been fairly
prevalent among these kinds and last
year it was very bad. It has long
been observed how much more re-
sistant to rot such red varieties as the
Dakota Red and the Clark No. 1.
are.

This fact has suggested a line of
investigation, and the Department
of Horticulture, at this institution, is
endeavouring to secure some European
varieties of white potatoes in the
hope that they will prove as resistant
to rot as our native reds. Have any
other colleges or experiment stations
carried on a similar line of work? If
they have, Prof. P. J. Shaw, Pro-
vincial Horticulturist, will be glad to
hear from them.

STUDENTS' MAGAZINE

Previous to the war, the students
of the Nova Scotia Agricultural
College published annually five
numbers of the college magazine—
the Maritime Students' Agriculturist.
Since 1914, the numbers issued have
been much reduced, but the students
have shown most commendable
enterprise in maintaining the con-
tinuity of their publication. This
year there are two numbers, the first
of which has just come to hand. The
most noteworthy feature is that
every article is written by a student.

NEW BRUNSWICK

THE BEEKEEPING INDUSTRY

BY L. T. FLOYD, B. S. A., PROVINCIAL APIARIST

IN the fall of 1917 I was employed
by the New Brunswick Depart-
ment of Agriculture to visit as
many beekeepers as I could locate
to ascertain if enough persons were
interested to warrant the formation
of an Apiary Division as a part of
the activities of the Department.
During the two months I visited
250 beekeepers scattered over five

counties. At the first of the year
1918 I was appointed Provincial
Apiarist with instructions to forward
the work of encouraging honey pro-
duction in the province. The plan
I adopted was to first visit each
beekeeper. I carried with me a
fully equipped ten frame Langstroth
hive, also some other articles of
equipment necessary for up-to-date

work. I used this equipment to demonstrate better methods of work.

On my first trip I planned for field meetings next season. In the sections visited the previous fall I held demonstrations during the latter part of June and the first of July and treated every case of foul brood I could locate. The balance of the summer was spent visiting beekeepers in the counties missed the previous fall. I listed 576 beekeepers with apiaries of one or two hives up to one hundred. Some of them get very good crops of honey of a fine quality.

Nearly all were working for section honey or keeping the bees in the old box hive way, smothering off the surplus swarms in the fall. The few who were working for extracted honey were producing good enough crops to make the future look exceedingly bright for the industry in New Brunswick. One of the converts to

better methods had an average crop of 132 pounds per hive.

Some of the larger apiaries report a crop of a ton or more. A large number of those visited seemed deeply interested and anxious to secure greater crops. The demonstrations were well attended. Some of the keenly interested ones travelled as far as twenty miles to attend. As soon as it was possible to compile a mailing list crop report forms were distributed and from the returns made the average per hive figured out about thirty pounds.

The work so far has brought a large correspondence and I believe will result in a large increase in honey production as well as a great improvement in the quality of the sample offered for sale.

The Beekeepers' Association of 118 members purchase its supplies co-operatively and last season handled about \$2,000 for this work which is fairly good for a beginning.

QUEBEC

MACDONALD COLLEGE

TRAINING FOR RETURNED SOLDIERS

MACDONALD College is giving a special course in agriculture to soldiers who have been discharged from the hospitals and are still under the Invalided Soldiers' Commission. After the experience of a year or more it was found that the regular two or four years' courses were not suitable for these men. The courses now provided are drawn up to suit their requirements as nearly as possible. They have been planned to extend over a period of three months. Many of the men will avail themselves of a longer period in order to receive special instruction and practical work in whatever branch they desire. Some of the men live in the college residence as regular students while others come to the college daily. A number of the men

have shown a preference for greenhouse work, others again for gardening, poultry raising, bee keeping and such other light branches as would be suitable to persons of impaired strength.

During the first period of any man's course he receives instruction in the following subjects: Horses,—their general care and management, daily routine, grooming, exercise, feed, watering, etc.; breeding, marketing, judging, stabling and also harnessing, driving, etc. Dairy cattle, beef cattle, sheep, and swine also receive consideration much in the same way as horses. The various cereal crops are studied and instruction is given in the selection and growing of the more important grain crops. The grass crops, corn, and roots are also studied.

Poultry and bee-keeping are taken up more or less in detail as is also horticulture, particularly market gardening. Besides these subjects the men receive instruction in the care and use of farm machinery, operation of

gasoline engines and tractors, elementary training in the construction of farm buildings and their upkeep, farm water supply, the destruction of weeds and insects and also questions in general farm management.

ONTARIO

DUNDAS COUNTY

AGRICULTURAL ORGANIZATIONS

AGRICULTURAL organization has developed rapidly in Canada since the system of agricultural representatives has been generally adopted. This is specially marked in the province of Ontario, where every county has its representative office. As an illustration of this progress the situation in Dundas county has been analyzed. The agricultural organizations in this, as in other counties, are not only extensive in their requirements but they are more or less interwoven, constituting a fabric that promises much for the prosperity of the rural community.

The organizations, though local in membership, receive their support from various agencies both federal and provincial. For three years the Commission of Conservation has been carrying on illustration work on farms as a specific undertaking, but the activities of the representative of this body have extended to many of the organizations in operation. That is to say, the Agriculturist of the Commission has worked hand in hand with the agricultural representative in organizing and carrying on the various activities that associations have undertaken. Most of the organizations have received the special attention of the agricultural representative and both federal and provincial governments have contributed to their support. We have, therefore, in the county of Dundas, as in other counties, a system of co-operation that might with advan-

tage be applied not only to organizations but to investigational and instructional activities as well.

JUNIOR FARMERS' ASSOCIATIONS

There are three Junior Farmers' Associations in the county, with a membership of seventy-five. The first of these was established in 1913. The junior farmers are made up of the young men who take the complete short courses held by the agricultural representative. The activities of these organizations are educational and social and embrace stock judging competitions at the short courses, social evenings during the winter months, picnic field days during the summer, literary meetings and debates, hockey clubs and competitions, and ploughing matches, the last-named having been established in 1918. These organizations form a very effective connecting link between the boy leaving school and the man emerging into the more serious responsibilities of life.

BOYS' AND GIRLS' HOME GARDENS

The Boys' and Girls' Home Garden Contest was first organized in 1916. It is open to young people between the ages of twelve and fifteen years. Each garden is required to be 20 by 30 feet and to produce not less than sixteen varieties of vegetables and fruit. Prizes are procured from the county grant divided into first, second and third awards. This movement like most of the others in the

county is general over the province. In Dundas county five centres competed in 1918. It is intended especially to interest children not attending rural school who have previously been prominent in school fair work.

SCHOOL FAIR ASSOCIATIONS.

School Fair Associations are the immediate and distinct product of the agricultural representative movement. They consist of organizations of boys and girls who are made responsible for the carrying on of the business of the school fairs. The first school fair in Dundas county was established in 1912, and last year four were held and included eighty schools and 1,400 pupils. At these combined fairs no less than 3,200 entries were made. The assumed attendance was 1,800 children and 3,500 adults in 1918.

In preparation for the fairs there were distributed last spring, by the agricultural representative, through the schools, 250 settings of eggs from bred-to-lay Plymouth Rock stock, besides 30 bushels of potato seed and 800 packages of flower seeds. The total amount of money distributed as prizes was \$350. This money was donated by township councils, school sections, and individuals.

The training afforded boys and girls through fair work will have far-reaching results in developing citizenship in the rising generation.

FARMERS' CLUBS

Farmers' Clubs were established in the county in 1908. Of these there are eight, with a membership of 996. While they were organized through the provincial Department of Agriculture, some of them are affiliated with the United Farmers of Ontario. These organizations hold social and educational meetings and farmers' picnics and purchase co-operatively such farm requirements as feed, salt, seed, coal, binder twine, etc. The Farmers' Club movement

is growing rapidly in membership and in business transacted.

EGG CIRCLES

Egg circles are the offspring of the federal Department of Agriculture through the Poultry Division of the Live Stock Branch. The first egg circle was established in 1909 and there are now seven in the county with a membership of about six hundred. The first year poultry products amounting to about \$3,000 were handled co-operatively, while in 1918 the business transacted amounted to some \$50,000. The central office for the county is at Morrisburg and is connected with the Dundas County Cold Storage Association, Limited, where a cold storage warehouse and candling station is operated under the direction of a salaried manager.

CO-OPERATIVE FRUIT SHIPPING

Co-operative fruit shipping has been under way in the county since 1915 when an association was established with headquarters at Morrisburg. It started with ten members and now has thirty. This association not only ships co-operatively but purchases supplies on a similar system. The first year they bought three hundred dollars worth of requirements, and in 1918 the purchases amounted to \$800. The second year of organization a little more than \$1,000 worth of apples were shipped, which was doubled the following year, and in 1918 the sales amounted to \$3,600. This organization is affiliated with the Provincial Fruit Growers' Association but markets its apples independently.

ILLUSTRATION FARMS

Illustration work by the Commission of Conservation was begun on five farms in 1916. In 1917 eleven more were chosen. There are four illustration farms in each township. The farmers on these farms co-operate with the Commission in practising better farming methods. The follow-

ing are among the matters considered: Crop rotation; suitable varieties and strains of grains; rates of seeding for best results; rates of seeding in red clover for best results; comparison of homegrown and purchased seed; summer pasture mixtures; after-harvest and other methods of tillage; labour saving devices; care and use of manures; farm garden, and directly and indirectly the encouraging of many other means to make the farm more profitable, the life more satisfactory and pleasant, and to help keep the young people on the farms.

The Agriculturist of the Commission visits the farms periodically for conference and discussion with the farmers regarding the work to be undertaken. Meetings are held on the farms from time to time and the neighbouring farmers gather, not to hear a platform speech but to see and study for themselves the actual results of the work being conducted. They bring their local problems along for discussion. These 16 farms are study centres and here in their own county, under their own conditions, the solutions to many of their problems are worked out. If a farmer sees in his own community, with his own eyes, the beneficial results of improved methods, he will be more likely to do likewise than if he hears about them only by means of reading matter.

THE BOARD OF AGRICULTURE

The Dundas Board of Agriculture in a large measure supersedes the Farmers' Institute of a few years ago. It has a membership of 165. Their activities include the holding of meetings and live stock judging courses. They encourage, by donations and otherwise, the school fair work in the county. In 1918, the Board of Agriculture conducted a farmers' excursion to the Central Experimental Farm, Ottawa.

WOMEN'S INSTITUTES

Women's Institutes are purely provincial in support. Of these

there are six in the county with a combined membership of about three hundred. In addition to their regular social and educational meetings, the institutes hold short courses in domestic science and home nursing. They are also very active in the encouragement of the beautifying of home surroundings more particularly with reference to lawns and grounds. While Red Cross and relief work has occupied much of the time of the institutes during the period of the war, their scope of activity is very broad and varied being limited only to the needs of the general welfare of the community.

HORTICULTURAL SOCIETIES

Dundas county is well organized horticulturally, there being four societies going strong. There is a total membership of nearly 500. Home and town beautification is given much attention and much has also been done towards increasing production through the backyard garden movement. In 1917, an auto excursion was run to the Central Experimental Farm by the Winchester Society and in 1918 a similar excursion was run under the combined auspices of the Horticultural Societies and the County Board of Agriculture. These excursions proved enjoyable and profitable and the event is to be made an annual one.

AGRICULTURAL SOCIETIES

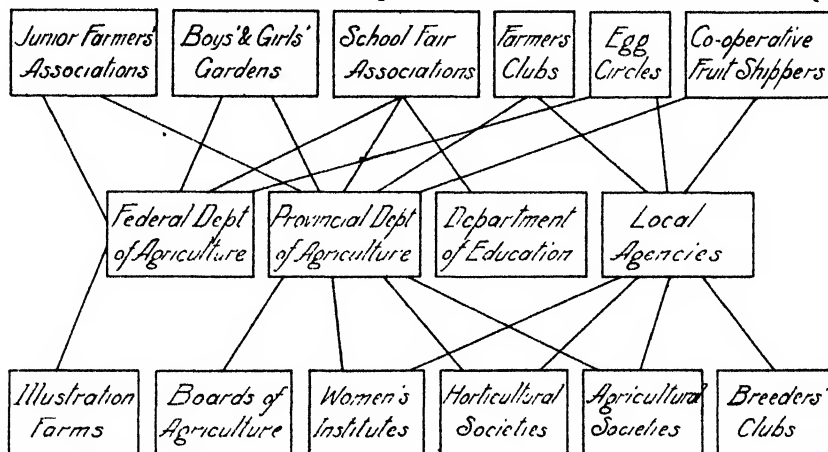
There are three Agricultural Societies in the county. They have been in existence for many years and have helped to stimulate interest in better farm crops and live stock through their annual fall fairs. The Winchester Society made a new departure in 1916 by making the first day of the fair a children's day. This in no way interferes with the school fairs and has now become an established part of the Society's annual event and the exhibits in this department are becoming

more numerous and better each year.

BREEDERS' CLUBS

The breeders of two breeds of live stock have organized clubs in the county. The Ayrshire breeders in 1915 organized the Dundas and Grenville Ayrshire Club, drawing its membership from these two counties. The following year the Dundas

District Holstein Club was established. The former has a membership of 45 and the latter of 28. The activities of the two are not precisely identical. The Ayrshire Club held a field day and judging demonstration in 1916 and a consignment sale in 1918. The Holstein Club holds educational meetings and are laying plans to buy a very high-class sire to be used co-operatively.



AGRICULTURAL ORGANIZATIONS IN DUNDAS COUNTY AND THEIR RELATIONSHIPS.

The above chart includes the classes of agricultural organization in operation in Dundas and shows the various sources from which they receive support. The federal Department of Agriculture provides assistance through the Live Stock Branch, the Commission of Conservation and The Agricultural Instruction Act. The Provincial Department of Agriculture, besides furnishing grants to various bodies, directs and controls the activities of the Agricultural Representative. School Fair Associations and Boys' and Girls' Gardens are inseparable from the public school and are therefore dependent to a considerable extent on the Education Department.

POTATO DISEASE INVESTIGATION

BY J. E. HOWITT, M.S. AGR., PROFESSOR OF BOTANY

THIS work was begun in the summer of 1917. The potato crop in Southern Ontario in 1915 and 1916 had been decidedly poor. Experiments conducted by Professor Zavitz at Guelph and by Professor Macoun at Ottawa with Northern Ontario potato seed had shown that such seed gave much better yields than that grown in Southern Ontario. It was decided, therefore, to make a survey of some

of the more important potato-growing sections of Northern and Southern Ontario to determine if possible what factors accounted for the superiority of the northern-grown seed potatoes. Professor Zavitz of the Ontario Agricultural College, Mr. Justus Miller, Assistant Commissioner of Agriculture, and Mr. W. A. McCubbin, Dominion Plant Pathologist, St. Catharines, made the survey in Northern Ontario. A

survey of three of the principal commercial potato-growing centres of Southern Ontario was made by Professor Zavitz, Mr. Miller and the writer.

The findings in regard to potato diseases were very striking. Northern Ontario was found to be practically free from the so-called "physiological diseases" such as leaf roll and mosaic, while in Southern Ontario these diseases, especially leaf roll, were found to be very prevalent. In some fields examined over 60 per cent of the plants were affected with leaf roll. It was clearly indicated by this preliminary survey that one of the factors accounting for the superiority of Northern Ontario seed potatoes was the comparative absence from the north of these two diseases, leaf roll and mosaic, which are known to be transmitted through the seed.

As the result of these preliminary investigations and of a representative conference of all interested in potato improvement work, a definite policy for the improving of the potato crop in Southern Ontario was decided upon. This policy included the continuation of the survey of the potato-growing sections of Southern and Northern Ontario, the employment of a staff of men who specialized in potato diseases to carry on the survey work, the conducting of an experiment to test the respective merits of seed potatoes grown in Southern Ontario, New Brunswick and Northern Ontario, the growing of seed potatoes of the highest quality on several of the government farms in Northern Ontario, and the initiating of an educational campaign to make known to potato growers the potato disease situation in Ontario and the desirability of using seed potatoes grown in Northern Ontario.

This definite policy so far as was possible was carried out during the past year. The Dominion authori-

ties heartily co-operated. Mr. Paul Murphy, Pathologist of the Dominion Department of Agriculture, had charge of the disease survey work and of the certification of disease-free seed in Northern Ontario. Mr. Miller, Assistant Commissioner of Agriculture, directed the educational campaign and the sale and distribution of the certified seed from Northern Ontario. The writer supervised the inspection for disease of the experimental plots of the Agricultural Representatives and of the potatoes grown for seed on the government farms in Northern Ontario.

Some interesting results were obtained from the experiments carried on in Southern Ontario by the Agricultural Representatives. The object of these experiments was to determine the best source from which to obtain seed potatoes free from leaf roll and mosaic and which would produce large yields. Green Mountain and Irish Cobbler seed potatoes from Southern Ontario, New Brunswick and Northern Ontario, were planted side by side in plots in nearly every county in Southern Ontario. Two sets of plots were planted in each county, one set on heavy soil, the other on light soil. The Agricultural Representatives and the farmers in their counties looked after the planting, spraying and cultivation of these plots. During the summer they were all inspected for disease and a record of the percentage of leaf roll and mosaic found in each lot made. This fall the Agricultural Representatives ascertained the yields obtained from the seed from each of the three sources. The following table summarizes the results of these experiments and shows the average percentage of leaf roll and mosaic and the average yields per acre from each variety from the three sources.

Variety	Source of Seed	Average percentage of leaf roll present	Average percentage of mosaic present	Yield per acre (bus.)
Irish Cobbler.....	Southern Ontario.....	45.5	2.4	127.7
Irish Cobbler.....	New Brunswick.....	5.1	3.1	148.0
Irish Cobbler.....	Northern Ontario.....	1.4	1.2	153.4
Green Mountain.....	Southern Ontario.....	8.8	29.3	167.8
Green Mountain.....	New Brunswick.....	3.5	61.8	137.3
Green Mountain.....	Northern Ontario.....	1.2	3.0	177.5

The above figures clearly show that seed potatoes grown in Northern Ontario were much freer from leaf roll and mosaic and produced larger yields than those grown in Southern Ontario.

Time and space will not permit of dealing in full with all the results obtained so far from the potato disease investigations being conducted in Ontario. The following therefore is but a brief summary of the progress made; leaf roll and mosaic have been found to be very prevalent in Southern Ontario. Seed potatoes grown in Northern Ontario have been shown to be freer from leaf roll and mosaic and to produce larger yields than those from Southern Ontario. Black-leg and rhizoctonia have been found to be the two most

serious and prevalent potato diseases in Northern Ontario. An educational campaign has been carried on to acquaint the potato growers with the disease situation in Ontario and with the desirability of obtaining seed potatoes from Northern Ontario. A system of inspection and seed certification has been inaugurated and a limited supply of northern-grown seed potatoes made available to the growers of potatoes in Southern Ontario for 1919.

This work is now well started and it is confidently expected that before long material results in the form of larger yields per acre of high quality potatoes in Southern Ontario will be realized and appreciated by the people of the province.

VEGETABLE GROWING DEMONSTRATIONS

BY A. H. MACLENNAN, B.S.A., VEGETABLE SPECIALIST

FOR the past year I have been engaged as vegetable specialist in the Ontario Department of Agriculture, succeeding the late S. C. Johnston. The work I am engaged to do is provided for under The Agricultural Instruction Act. I have completed a survey of the province in relation to the vegetable growing industry. The discovery has been made that vegetable growers, including more especially members of the Vegetable Growers' Association are not taking the advantage that they might of the experimental work that is being carried on at the College and other places on their behalf.

Considerable attention has been paid to the insect and fungoid troubles with a view to helping growers to overcome these difficulties.

The cabbage maggot has been proved controllable by the use of a solution of corrosive sublimate consisting of 1 ounce of the poison to 10 gallons of water. Three thousand two hundred cabbages in one patch were treated at a cost of \$5.25, with only 2 per cent loss of plants. Plants require to be sprayed with the solution the fourth or fifth day after setting and each week thereafter for three weeks. Because this solution has a detrimental effect on the

bacteria in the soil a saturated salt solution will be tried this year and reported upon.

For onion blight Bordeaux mixture was tried but had but little effect. A better treatment was found to be a top dressing of nitrate of soda when the bulbs are forming. This treatment will be given further trial. Black heart in celery has been found to be controllable by the use of "Black Leaf 40" in the Bordeaux spray. Four ounces to 40 gallons of Bordeaux is recommended. This disease, it has been ascertained, may be caused by both the tarnished plant bug and a blackgreen aphid. Spraying was started on June 9th and repeated 9 times by the 9th of August. In treating celery blight Bordeaux mixture was found satisfactory as was also dusting with sulphur and

lime. The formalin treatment—1 pint to 20 gallons of water—was found to have merit for this disease, but it should be followed with Bordeaux mixture.

Tomato mildew in greenhouses was overcome by fumigation with sulphur.

A garden tractor was placed at the disposal of the service for demonstration purposes. It was tried out at the Agricultural College and in the vicinity of London, Brantford, Toronto, and Kingston.

Since November 1st most of my time has been spent in instructing returned soldiers at the Convalescent Hospital, Guelph, where many wounded men have shown a desire to take up vegetable growing as a livelihood.

THE SECOND FARM MANAGEMENT SURVEY

THE Ontario Department of Agriculture has compiled the information secured in the second farm management survey carried out by the Ontario Agricultural College under the direction of Professor Andrew Leitch. The first annual survey, which was made in the township of Caledon, Peel County, on one hundred and thirteen farms, was reported in *The Agricultural Gazette* for May last year. The second survey was made in Oxford county where four hundred and thirty-seven farms were examined. This county was selected because dairying is followed almost exclusively and represents cheese making, butter making, city dairy trade and the making of condensed milk and milk powder.

The objects of the survey were:—

1. To determine the true financial condition of the dairy farming business.
2. To determine the cost of production of milk.
3. To discover the features of the business that have the greatest effect in raising or lowering farm profits.

4. To give suggestions for the most profitable organization of the dairy farming business, based on the conditions found on the farms which showed the greatest financial returns.

The method pursued in getting the information was to have an experienced young farmer, trained for the purpose, call on each farmer and procure for him on specially prepared forms, a record containing the following details of his business:

1. Size of farm, acres tillable, and acres in various crops.
2. Yield of various crops and receipts from sales of crops.
3. Numbers and values of all kinds of livestock handled, bought, and sold during the year.
4. Sales of milk and other livestock products.
5. Purchases of feeds and seeds of different kinds.
6. All other current expenses in detail. Labour, repairs, taxes, threshing, veterinary, etc.
7. Numbers, values, and probable life of all kinds of farm machinery.
8. Actual value of farm, and value and expected life of all buildings.

The figures obtained by the different field men were carefully checked up by a highly trained man. Upon

the completion of the work in the field the report of each man's business was worked up on a specially prepared and compact office sheet and his profits or returns were figured out along with such additional data as his returns in milk per cow, crop acres per horse, feed per animal, cost per cwt. of milk and many other factors that have a bearing on the successful operation of farms.

CONCLUSIONS AND RECOMMENDATIONS FROM THIS SURVEY

1. That farm profits of the average farmer increase as the size of farm increases.
2. That many farms can be profitably increased in size by clearing and draining rough land.
3. That there are many opportunities for increasing profits without increasing the size of the farms.
4. That the greatest opportunity lies in increasing returns from live stock.

5. That this increase can be most effectively obtained by better breeding methods.

6. That an increase in crop yields brings greater profits, but only if accompanied by keeping up and improving the quality of the live stock.

7. That efforts should be made by dairy-men to produce at least 40 per cent of their milk in the six winter months.

8. That the best organized farm business for the average dairymen is that which gives about 70 per cent of the total revenue from dairy cattle and the balance from other sources, crops, hogs, horses, etc.

9. That the dairy business offers large returns for men specially fitted for specializing in high producing cows.

10. That the cost of milk during year of 1917 was \$2.20 per cwt.

11. That the farmer should have received an average of \$2.52 per cwt. for milk to give him a reasonable profit on his year's business.

Details upon which the above conclusions were based are presented in tabular and descriptive form in a pamphlet issued by the Ontario Agricultural College.

PASTEURIZATION AND BUTTER KEEPING

BY J. H. SCOTT, OFFICIAL BUTTER GRADER

IN our butter grading experiments during the past two years we have had ample proof that pasteurization of the cream adds greatly to the keeping quality of the butter made from it. Samples of butter graded as "seconds" when made from properly pasteurized cream do

not deteriorate in cold storage but remain about as they went in. On the other hand freshly made butter of the first grade made from raw cream soon deteriorates to very poor second quality even when held at the recognized temperature for butter storage.

HORTICULTURAL EXPERIMENT STATION DEVELOPMENTS THE VINELAND STATION

WITH a view to increasing the value of the Horticultural Experiment Station at Vineland, the equipment has been materially increased. Two new green houses, each 30 feet wide by 75 feet long have been erected. These are connected by a house 16 feet by 56 feet. It is proposed to make this central connecting house a show house and to use the others largely for propagation, plant breeding and seed production work with vegetables. Dwarf apple trees grown in pots will be used for tree fruit investigations. The strawberry is to receive special

attention in the garden work in future. Upwards of 50 acres of land have been added to the farm. In order to improve the mechanical condition of the soil an extensive system of tile drains has been put in. As a further improving medium a large part of the acquired ground has been limed. Four thousand five hundred peach tree seedlings and hybrids were planted during the past year. These have been put in sufficiently close to allow room only for the fruit coming into bearing in order that the worthy sorts may be saved and the others discarded. A

number of improved varieties are looked for from among the seedlings and hybrids. One hundred and fifty apricot seedlings, an equal number of pear seedlings besides two acres of hybrid strawberries and one acre of named strawberries have been put in.

A further development has been

the establishment of a nursery for young seedlings for the plant breeding work. Of these 33,000 grape hybrids and 23,000 gooseberry seedlings are under test. As a result of these extensions the Experimental Station bids fair to be of still greater service to the fruit growing industry in the Niagara Peninsula.

THE FORT WILLIAM STATION

THE Northern Ontario Plant Breeding Station at the Industrial Farm, Fort William, carries on a useful line of work provided for under The Agricultural Instruction Act. The work carried on in 1917 was recorded in The Agricultural Gazette for July last year. Considerable new work was undertaken in 1918 and included, by plant breeding, the production of several varieties of strawberries especially suited for Northern Ontario.

Among the importations of nursery stock were specimens introduced from Asia. The tree fruits were increased by the planting of the Hibernian apple and Darrt crab to be used for top-working. Hybrid varieties of apples and plums raised in the nurseries of the prairie provinces and the northern States were introduced, as well as some promising Russian pears.

A shipment of Bacurjaney apple seedlings produced from seed secured in the Caucasus Mountains in Russia were set out. These are stated to be as hardy as the *Pyrus baccata* and much superior in size and quality.

In vegetable work sufficient variety tests were made to give strong hopes that especially useful varieties of peas, celery, lettuce, beets and other classes will be developed. Steps

have been taken which will probably result in obtaining some improved varieties of potatoes. In 1917 potato seed apples were gathered in quantity from a patch of the Green Mountain type. From 257 seedlings set in the field, 28 hills were saved as separate units. Among these are many types as to shape, size, numbers in a hill, depth of eyes, smoothness and color. These selections will be developed next season and studied with the hope of gaining an earlier white potato of quality and high yielding properties—and also strains of first-class quality which are heavier producers than those now available to northern growers, and a strain which shall be especially well suited to culture on clay soils. Of the hills harvested from the seed sown in the spring some had as many as 50 small tubers; one single tuber weighed $5\frac{3}{4}$ ounces and the largest weight of tubers from a single hill was 1 pound 10 ounces.

This station is doing an important work in the distribution of planting material. Distribution which commenced last year comprised forest tree seeds, forest pulled seedlings, fruit trees, fruit seeds, vegetable seeds and flower seeds which were sent to different customers. This distribution, it is expected, will grow rapidly with the coming years.

COMMUNITY LIFE MOVEMENT.

BY F. P. KNAPP, RURAL Y.M.C.A SECRETARY, TORONTO.

THAT communities, like individuals, need be "re-born" is the belief of the Ontario Rural Community Life Movement. It is proposed, through local institutes that are in a way affiliated with the Ontario Agricultural College Summer School for rural leaders, to awaken resident forces in rural communities and inspire them to function properly in social building.

The movement originated in 1917 at the Guelph Summer School. In a general way each local institute attempts to co-ordinate the work of organizations and institutions such as churches, schools, clubs, societies, etc., and so far as possible to avoid over-lapping of activities. Efforts are made to establish as definitely as

possible community boundaries and to keep before the people of the community a vision of what an ideal community should be.

Last year institutes were held at Whitby, at Russell, and at Otterville. This year four will be held, at Appin, Glencoe, Alvinston, and Inwood. At these institutes local and outside speakers are used. There is also a presentation and thorough discussion of such subjects as community health, co-operation, school problems, boys' work, Bible classes, surveys, play and recreation, community singing, etc. The movement feels a responsibility for the success of the annual Summer School for teachers held at the Ontario Agricultural College

VEGETABLE BREEDING

BY J. W. CROW, B.S.A., PROFESSOR OF HORTICULTURE

IT was made obvious in the early days of the war that if homegrown vegetable seed were to prove

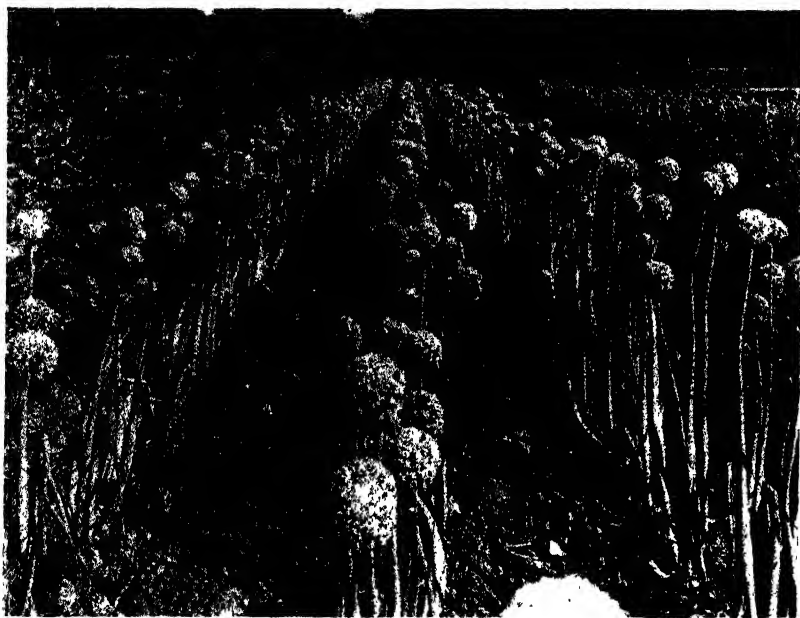
satisfactory stocks of seed would require to be bred up and vastly improved with respect to purity.



CELERY PLANTS PRODUCING SEED UNDER GLASS AT O. A. C.

Many, perhaps most, of our vegetable varieties are more or less impure at best and under war conditions of seed

Department of Horticulture at the Ontario Agricultural College began in the spring of 1915 the work of



VEGETABLE SEED GROWING IN O. A. C. GARDEN, 1918

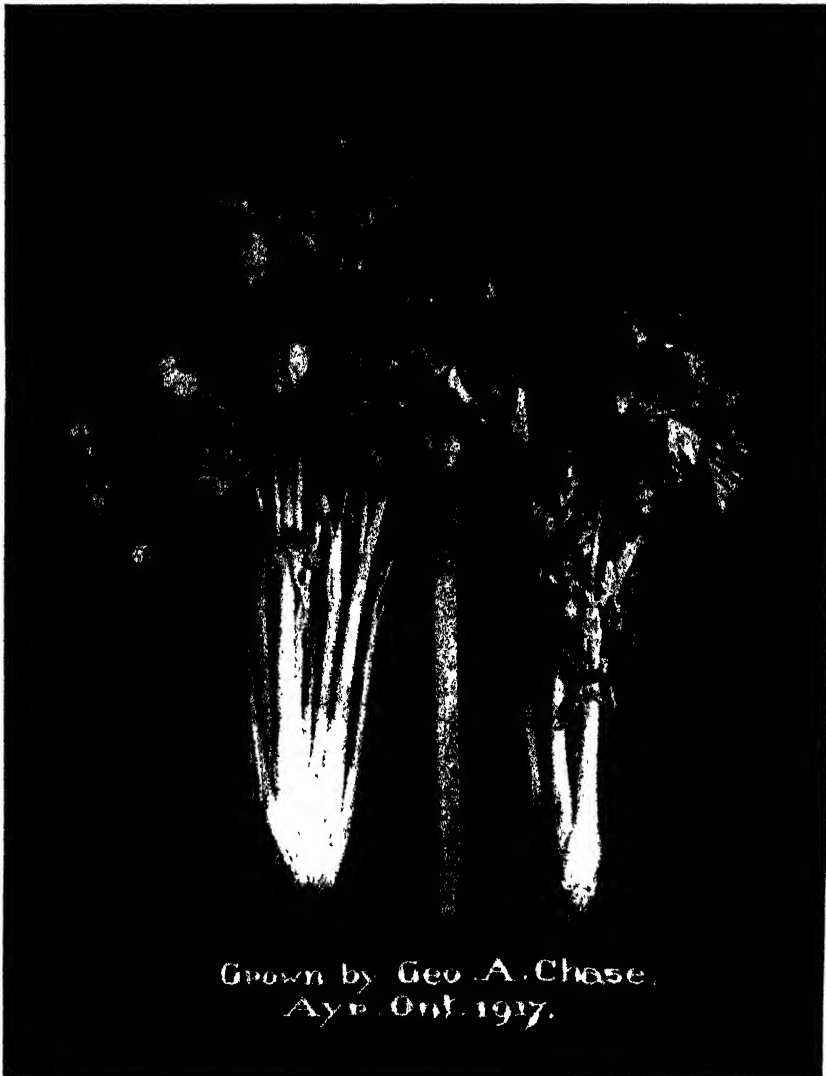


IMPROVED STRAIN OF PARIS GOLDEN SOUTH BLANCHING CELERY PRODUCED AT O. A. C.

growing the purity of stocks has deteriorated very seriously. The purifying strains of important vegetable varieties. Considerable progress

has been made and some highly improved strains have been developed. Limited quantities of choice stock seed are available to bona fide seed growers in Ontario, and, through Mr.

will be offered for sale to market gardeners. We are anxious to get in touch with growers of vegetable seed in the Province of Ontario or with market gardeners who are interested

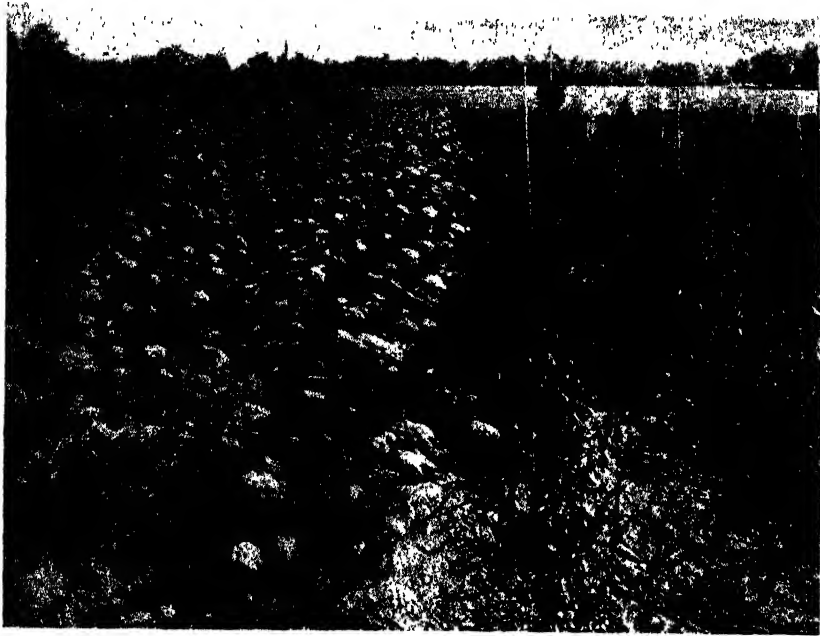


PLANT ON LEFT GROWN FROM O. A. C. STRAIN PARIS GOLDEN, PLANT ON RIGHT
GROWN FROM COMMERCIAL SEED

A. McMeans, Seed Specialist of the Dominion Seed Branch, stock seed of several varieties is being placed with seed growers for increase under contract. The increase thus obtained

in high class stocks. Following is a list of the varieties of vegetables with which this careful breeding work is being carried on:—

Celery...	Paris Golden Self-blanching	Onion...	Southport Yellow Globe.
Beet....	Detroit Dark Red.	"	...Danvers Yellow Globe.
Carrot...	Chantenay.	Parsnip...	Hollow Crown.
Cabbage..	Jersey Wakefield.	Spinach..	Long Standing.
"	...Tender Eight-weeks.	Lettuce...	Grand Rapids.
"	...Glory of Enkhuizen.	"	Wayahead.



VEGETABLE SEED GROWING IN O. A. C. GARDEN, 1918

AGRICULTURAL REPRESENTATIVE ACTIVITIES

GREY COUNTY

BY H. C. DUFF, B.S.A.

THE Victoria Live Stock Club has eighty-six members and their business last year exceeded \$325,000. In 1915 their sales from May to October amounted to \$82,000. In 1916, \$222,000, 1917, \$250,000. Two members joined this club very recently and their first delivery of animals proved decidedly inferior in comparison with those delivered by the other members. It has been the experience of the Victoria Club that new members make rapid progress in improving the finish of their stock, because they are influenced by the example set by the old members. The members of the

club pride themselves on the quality of stock they ship, which undoubtedly accounts for the excellent sales which they make.

While training our stock judging team, we learned that our four weeks' course in agriculture last winter resulted in a few changes in the methods of farming that have attracted the attention of many people. A number of the boys came from the farms where it was not the practice to grow clover, but in every case clover was sown during the spring. Our lectures resulted in the boys comparing the fertility of their land where there was timothy and no

clover with other farms where there was an abundance of clover. By noting the difference in appearance and the fertility of the soil, and by seeing a better quality of grain

obtained from the clover fed farms, they were able to put up strong arguments to their fathers to invest in clover seed.

WENTWORTH COUNTY

BY W. G. MARRITT, B.S.A.

The Board of Trade in the city of Hamilton has organized a farmers' section which is doing some successful work. Prominent men in the agricultural world are brought to Hamilton on Saturday when many of the farmers from the surrounding district come into town to do their business. The idea is to make these meetings as much like a Canadian Club as possible, only relating most of the addresses to agriculture. One pleasing feature is the better feeling which has been created during the year between the city men and the farmers. The city Board of Trade, with the assistance of the Farmers' section, has been able to carry out several

schemes which have been of benefit to all concerned. This year, by the united efforts of the Board of Trade and the farmers' section an enlarged scheme for the Hamilton market has been undertaken. The old market square is to be cleared away and shelters erected for the use of the farmers in the county. The chairman of this section is the warden of the county, with the agricultural representative as secretary. No better method of securing better relationships between the city and country could be attempted than of organizing a farmers' section of the city Board of Trade.

LENNOX AND ADDINGTON COUNTIES

BY G. B. CURRAN, B.S.A.

The county convention of farmers' co-operative associations was held in Napanee during three days about the middle of January. Although many of the country roads were blocked with snow, audiences from one hundred and fifty to five hundred were present at the meetings. One of the best addresses received was from Mr. F. C. Hart, Director, Co-operation and Markets Branch of the Ontario Department of Agriculture, who advised co-operative associations to do business on a basis whereby they have a profit at the end of the year and thus demonstrate that co-operation is successful in saving

money. Although many excellent addresses were delivered, perhaps the greatest benefit from the convention will be derived from the informal talks the managers and members had outside the regular convention hours. Farmers from different parts of the county got acquainted with one another and henceforth will be better able to co-operate one association with the other. All of the associations feel that the selling of farm products is even more important than the buying of supplies. Plans are being very generally made to start the co-operative shipping of hogs during the next few months.

PRINCE EDWARD COUNTY

BY A. P. MACVANNEL, B.S.A.

A demonstration in stumping by blasting was conducted on a farm that had lost a large proportion of their apple trees in the severe winter of 1917-18. The demonstration

proved that stumps of trees fifteen years of age and upwards can be readily removed by the use of explosives.

ESSEX COUNTY

BY J. W. NOBLE, B.S.A.

At the conclusion of our short course a Junior Farmers' Improvement Association was organized. A feature of the first meeting following organization was a motion pictures demonstration representing advanced

phases of agriculture. This class will undertake the competitions arranged by the Department of Agriculture, including acre profit contest in corn for seed, acre profit for oats, feeding hogs for profit and baby beef.

MANITOBA

DEVELOPMENT OF FODDER CORN

BY W. SOUTHWORTH, M.S. AGR., ASSOCIATE PROFESSOR FIELD HUSBANDRY DEPARTMENT

THE commencement of experiments on the development of fodder corn at the Manitoba Agricultural College dates from 1913. At that time, Professor Moorhouse, who was head of the Field Husbandry Department, obtained four varieties for trial, viz.:—*Quebec 28, White Flint, Free Press, Longfellow.

For the purpose of making a comparative test, these varieties were handed over to J. H. Bridge, B.S.A., who was then assistant in the Field Husbandry Department. The same year (1913) Mr. Bridge had all the varieties planted, and, from the ears produced, selections were made to plant the following year.

Seed from the selected ears was sown in 1914 and further selections made. In this season, another well-known dwarf variety "Gehu" was included in the test plots.

In selecting cobs for seed some attention was given to fancy points, such as evenness of rows and well-filled tips, but the basis of selection which was specially emphasized was early maturity.

After the work of 1915 had been concluded and the results for the three years studied, it was decided

that, of the varieties tested, Quebec 28 seemed to be the one best adapted to Manitoba conditions. This variety was found to produce a fair amount of stalk and leaf. The cob was of fair size and situated well up on the stalk, and, moreover, it matured almost as early as the dwarf varieties—Free Press and Gehu.

In the fall of 1915 the writer of this article was appointed to make special investigations in the breeding of forage crops, and arrangements were made to continue the work on the improvement of corn commenced in 1913.

In the spring of 1916, the selected ears from the 1915 crop were planted in ear rows, the rows being placed three feet six inches apart, and the seed one foot apart in the rows.

Planting was done on June 2nd. This is about one week later than our average time, but, as the weather was warm, and with plenty of moisture in the land, both the germination and subsequent growth were very rapid.

About the beginning of September, 1916, light frosts cut down the tips of the leaves, but the grain escaped and it continued to fill in and develop up to the middle of the month.

The following table gives some of the outstanding results obtained in 1916:—

* The seed of Quebec 28 was obtained from Professor L. S. Klinck, Macdonald College, Quebec, who was responsible for the development and introduction of this variety.

	No. of Days to mature
Date of planting, June 2nd.	
Date of selecting first mature corn, Sept. 12th.....	102
Date of husking general crop, Sept. 17th.....	107
Average number of plants in ear row	111
Average number of well matured ears.....	105
Average number of well grown but immature ears.....	33

Klinck of the British Columbia University very kindly supplied a few specimen ears of his own selection of Quebec 28. With a view to guarding against too much in-breeding in our own strain, this new lot of seed was interplanted with our own seed so as to encourage the strains to intercross to the greatest extent possible, and thus keep up the vigour of the variety.

Unfortunately, the season of 1917 was a poor one for corn in Manitoba,



FIG. 1—QUEBEC 28 CORN—1918 CROP

SEED PLANTED JUNE 3RD, PHOTOGRAPHED SEPTEMBER 7TH; GROWING PERIOD 96 DAYS; AVERAGE HEIGHT 53 IN. (TASSEL NOT INCLUDED). NOTE THE ABUNDANCE AND FULL DEVELOPMENT OF BOTH COBS AND LEAVES

<i>Yields calculated per acre at 70 lbs. per bushel</i>	bush.
Average total yield per acre from 10 ear row	78 6
Total yield per acre from lowest yielding ear row.....	51 8
Total yield per acre from highest yielding ear row.....	99 3

The above yields show in a striking manner the wide difference between the best and the worst ear rows, and give some indication with regard to the improvements which may be expected from a judicious selection of seed corn.

In the spring of 1917, Professor
56037—4½

and our Quebec 28 was badly frozen whilst in the milk stage, and, in consequence, the crop of seed corn was almost a complete failure.

However, having good seed in reserve from the 1916 crop, this was used for planting in 1918. This year, in addition to the breeding plots which were continued for the purpose of making further selections, it was decided to test the cropping power of our strain of Quebec 28, along with several other well-known varieties, when grown under average field conditions.

For this purpose seed saved from the 1916 crop was handed over to the experimental department in soil and crop management. The Superintendent of this Department, J. Ellis, B.S.A., who had charge of the work reports the results of the tests as given in the accompanying table.

VARIETIES OF CORN GROWN FOR GRAIN ON EXPERIMENTAL PLOTS, 1918

Variety	Sown	Husked	Bushels of cobs per acre	
Quebec 28 (M.A.C. 1916).....	May 30th	Sept. 26-27	bush. lb.	
Gehu.....	"	"	101	50
Frec Press.....	"	"	79	10
North West Dent (M.A.C. 1917).....	"	"	47	30
N.D. White Flint.....	"	"	23	50
Improved Squaw.....	"	"	None	
Golden Glow.....	"	"	"	



FIG. 2—NORTH WEST DENT CORN—1918 CROP
SEED PLANTED MAY 29TH; PHOTOGRAPHED SEPTEMBER 9TH; GROWING PERIOD 103 DAYS; AVERAGE HEIGHT 67 IN. (TASSEL NOT INCLUDED)

SELECTIONS FROM NORTHWEST DENT

One of the varieties of fodder corn which has taken a leading place with farmers in Manitoba is the North West Dent. Of the Dent varieties this is one of the earliest to mature, and, although it does not ripen so quickly as Quebec 28 and is usually deficient in well-developed ears and leaves, yet it bulks up much better for total weight of fodder.

As North West Dent possesses some excellent qualities as a fodder corn it was decided in the season of 1917 to see what could be done towards developing an earlier maturing strain of this variety.

It has already been pointed out that the season of 1917 was decidedly unfavourable for our corn crop, but a sufficient yield of fairly well-matured ears was produced to enable

the work to be continued in 1918. When tested along with the varieties as shown in the table given above, it will be seen that for weight of cobs North West Dent takes a very low fourth place.

However, the breeding plot sown with selected seed gave a much better return as will be seen from the photograph in Fig. 2.

Some of the rows on this plot averaged one good ear per plant, and the crop as seen in Fig 2 is five feet seven inches high, not including the tassel.

Though the growth was checked by frost in the early part of September, a fair crop of ears sufficiently well-matured for seed was secured,

from which selections will be made to continue further trials.

On the whole the results of this preliminary work in selecting seed corn are quite encouraging, but, as season and soil conditions vary from year to year, it is necessary, in order to obtain reliable results, to have the tests continued over a series of years.

HYBRIDIZING CORN

Some preliminary tests have been made in crossing several varieties of corn, but as yet our work has not advanced far enough to warrant making a report of the results obtained.

CORRESPONDENCE COURSES IN AGRICULTURE

THE Manitoba Agricultural College has instituted a correspondence agricultural course to occupy approximately one year for the benefit of residents of the province who desire to study agriculture and are not able to attend the college. The following courses have been provided:—

1. *Poultry Husbandry*, by Prof. M. C. Herner; selection of breeds, feeding and raising chicks, production and marketing of eggs, and similar topics as studied.

2. *Drawing—Building Construction*, by Prof. L. J. Smith. This course includes exercises in lettering, tracing and making working drawings for farm buildings and equipment.

3. *Soil Management*, by Prof. T. J. Harrison. Some of the topics covered are tillage, implements, and their effect upon the soil; preparing virgin soils for crop production; summer fallowing; preparing suitable land for crops; commercial fertilizers; green manures; farmyard manures; crop rotations; weed control; alkali, peat and muck soils.

4. *Dairy Husbandry*, by Prof. R. W. Brown. This course takes up the subject from the point of view of raising and feeding dairy cattle, the production of milk and the manufacture of dairy products.

5. *Farm records and accounts*, by Prof. A. H. Benton. Both farm book-keeping and cost accounting methods are studied. A

farm account book and cost production forms are furnished for actual use on the farm.

6. *Manitoba Weeds*, by Prof. V. W. Jackson. This course is primarily prepared for weed inspectors; but is suitable for farmers and others who wish to get better acquainted with Manitoba weeds.

7. *Botany and Nature study*, by Prof. V. W. Jackson. This course is of particular interest to school teachers. Loans of slides, pictures and other material will be made to those taking the course.

8. Horticulture, including small fruits, farm gardens and tree planting.

9. Home nursing.

The fee for each course has been set at \$10. As reading material for each course the College has prepared either a series of study papers, or is recommending a text book, or a collection of bulletins, or a combination of all, according to the material available. These are supplied by the College. In conducting the courses questions are prepared, based on each text furnished and the students answer the questions at leisure. Up to February 12, 160 inquiries had been received of which 139 were for special courses and a considerable number had registered by that date.

ALBERTA

EXTENSION OF DEMONSTRATION FARM AND FARM SCHOOL SERVICES

BY JAS. M'CAIG, M.A., CHIEF PUBLICITY COMMISSIONER

THE Department of Agriculture of Alberta is making progress in the extension of its service for agricultural improvement. Last summer a demonstration farm was purchased and set going in the Raymond district. This farm is to take account of work under irrigation and will aim to establish the possibilities of irrigation farming to a higher point probably than has been illustrated in general irrigation farming in the province so far and especial care will be taken to follow a detailed system of costs with regard to the performance of labour, of the production of fodders and other feeds and the ultimate marketing of these through channels as may appear to be most profitable. Another demonstration farm has been recently purchased at Youngstown in the Acadia constituency. It consists of a half section near the town of Youngstown.

Following the plan that has been carried out in cases of the other schools it may be that these farms will develop into agricultural school centres later just as has been done at Olds, Claresholm, and Vermilion. The Minister of Agriculture is favourable to making the service of education for farm boys and girls as nearly

local in availability as possible and it is felt that one of the farms and schools should be established in the irrigated country in view of the development which irrigation has already attained and likewise in view of the prospect of larger reclamation work in the future. The Member for Acadia, who is taking an active interest in the development of the agricultural schools of the Province, is likewise hopeful of securing a school on the Youngstown farm. These two districts might be expected to be school centres in the near future on account of their geographical position. There is no prospect of these schools being built this year however as the government has in view the furnishing of dormitory accommodation at the schools already established and it is expected this will entail an expenditure of about half a million dollars. The difficulty of securing comfortable and safe boarding houses at reasonable cost and of safeguarding the health and morals of the country boys who are away from home, have had the effect of influencing the government to make this kind of provision and it will likely have a place in the estimates of this session of the legislature.

DEPARTMENT OF SOILS

The Senate of the University of Alberta has decided to open a department of soils which it is expected will be established in readiness for the autumn course of 1919. Following the scheme adopted in some of the large universities of the United States, the Alberta University will have three major

departments which are devoted to animal husbandry, field husbandry and soils. The head of the soils department will not only give a lecture course to the students but will have charge of the provincial surveys in soil testing and soil maps, indeed he will be consulting agent on all matters pertaining to the soils of the province.

BRITISH COLUMBIA

SILO DEMONSTRATIONS

BY R. J. FERRIS, SILO DEMONSTRATOR

DURING the year of 1918 silo demonstration work has been carried into new territory. In the Cariboo country more than 180 miles north of Ashcroft, two modern demonstration silos were put in on well equipped dairy farms. At Falkland, another out-of-the-way place some 38 miles west of Armstrong a silo was built and a demonstration in filling was given in the presence of a well attended meeting.

There are two districts in British Columbia where the farmers have not yet realized the advantage of using silage to feed their live stock. I refer to the large tract of land which is being developed adjoining the Grand Trunk Pacific Railway and also the district around the east end of the Kootenay Lake, Creston and Cranbrook. There is a very large growth of forage in the north due to a plentiful rain supply and when the grains fail to mature, or rain interferes with the hay-making the silo would take care of the crops. In the southern district they have a warm dry climate during the growing season and such crops as corn and alfalfa produce heavily. Summer silage could be fed in this district to advantage, in fact it would be necessary from an economic standpoint to use silage in many cases throughout the year. Educational work is being carried on in these districts, and at present three applications have been received for silos in 1919.

Greater interest is being shown by the farmers in the feeding of silage to beef stock. Silos have been built this year in several places to provide succulent feed for cattle that as a rule have been fed principally on dry hay during the winter. Several of the larger stock ranches are at present considering the advisability of using silage when wintering their stock. Steers wintered on alfalfa

silage in the Vernon district brought a good market price in the early part of last year. Silos would be useful to those ranchers who are directly interested in the development of the Bulkley valley and Nechaco districts as a stock-raising country.

One of the strong arguments advanced against building a silo is the expense of machinery for filling. In 1917 a silo was built and filled under the supervision of the department of agriculture's representative at Willow Point near Nelson. Last year five more silos were built by farmers in this locality, the largest being 9' x 27'. These were all filled with corn by a machine which was co-operatively owned by farmers in this district. Interchange of labour saved cash expenditure for help. These men who are each keeping a few head of dairy stock as a sideline on their fruit farms have proved that by co-operation it is profitable to build a silo 8' x 20'.

There has been a large increase during the last year in the number of silos in the province. The system which has been followed during the last four seasons by the Livestock Branch of the Department of Agriculture of assisting in the building and filling of silos in new districts with funds provided under THE AGRICULTURAL INSTRUCTION ACT has introduced them into the majority of our farming communities. Up to the present ten silos have been built and eleven filling demonstrations held in farming districts near the main line of the Canadian Pacific Railway. From Enderby south to Penticton, including the Okanagan, nine silos have been erected and the filling demonstrations have been well attended. From Revelstoke south, six have been built in the Arrow Lakes district

and other farmers have built and are contemplating building silos this year. Three have been placed at different points in the Columbia valley and six in the Fraser valley. Many of the other valleys on the mainland have been visited and a silo has been built and filled in order to leave a practical lesson of the benefits to be obtained by feeding silage. Fifteen silos have been erected on

Vancouver and adjacent islands and a large number of filling demonstrations held. We have up to the present time built sixty-three silos and also held fifty-one filling demonstrations. Ontario is the only province in Canada that has more silos per capita than British Columbia. By maintaining the present rate of progress this honor will be annexed by this province in the near future.

INTERNATIONAL ASSOCIATION OF POULTRY INVESTIGATORS AND INSTRUCTORS

Just as this number of the Agricultural Gazette was about to go to press Mr. W. A. Brown, Chief of the Poultry Division of the Live Stock Branch left for England to attend a meeting of the International Association of Poultry Instructors and Investigators to be held in London commencing on March 10th. In summoning the Conference, Professor Edward Brown, President of the Association reviews the poultry situation:

"No branch of food production has suffered during the war to a greater extent than that of poultry and eggs. In many countries of Europe it has almost disappeared, whilst in others scarcity of feed and high prices and closing of markets have compelled serious reductions of poultry flocks. Probably a conservative estimate is that European production is now not more than 40 per cent of what was the case in 1913. Further, in several countries there has necessarily been a complete cessation of instruction and investigation in this subject and of organized efforts for its maintenance, development and improvement.

As a consequence the shortage of supplies of eggs and poultry is very great, and prices have advanced enormously. Imports into the United Kingdom have fallen by about 60 per cent,—and of eggs alone the decline is about 130,000 tons. The same is seen elsewhere to a greater extent. Such conditions will continue for years unless a determined effort is made to rebuild the poultry industry. Moreover, the opportunity of increased production presented in lands where feed is abundant is greater than ever.

A great responsibility rests upon the nations which have not been devastated by the war, not only to extend their operation but to assist in the work of reconstruction of the stricken lands. That is a task demanding the co-operation of all. To that end re-establishment of teaching and research institutions is equally important with restocking the areas denuded of poultry. Large numbers of those engaged in poultry teaching and production have been killed during the war. The need for training others to fill their places is imperative."

PART III

Junior Agriculture

DEMONSTRATIONS, COMPETITIONS, AND CLASS-ROOM STUDIES IN
RURAL LIFE FOR BOYS AND GIRLS

PRIZES FOR BOYS' AND GIRLS' COMPETITIONS

There is a wide variation of opinion and practice with regard to prizes offered for boys' and girls' agricultural competitions. Not only is there differences in the views held with regard to the amount of awards provided, but whether these should be in money or other material things is also a debated question. With a view to standardizing this matter on a basis of experience, there are brought together in this number in the following series the views of responsible officials in different parts of Canada, not only so far as school fairs are concerned, but competitions of other classes.

PRINCE EDWARD ISLAND

BY J. E. MCLARTY, DIRECTOR RURAL SCIENCE DEPARTMENT, PRINCE OF WALES COLLEGE

THE granting of prizes to the winners in competitions is as old as our exhibitions, or commonly called fairs. For years it has been the custom to grant prizes, usually money, to the three highest competitors in any competition. This same method has been carried to our sports. It has always been the usual custom to grant a first, second and third prize. Even in our schools this system has been followed and encouraged. Prizes have been offered to the outstanding students (so far as passing examinations have been concerned) for many years. Many a time we have heard it said that the winner of the prize would have headed the class even if a prize had not been offered. It therefore is true that for many years competitors have been encouraged by the offering of prizes.

Then again the question arises, has this method of prize giving tended to induce competitors to "play crooked" in order to win the prize. If this be true, and we hear many cases cited to prove that it is, then the present system

of prize giving must be lacking. Some means must be adopted whereby the honest competitor will win over the dishonest competitor. If it has worked to this end with our grown-ups, we must devise some new method in order to encourage our young competitors at our school fairs to compete in an honest way, and we believe that most of our children would be honest in their competitions if it were not for the selfish encouragement often carelessly given by the grown-ups.

This, we believe, is a serious question, and one requiring careful consideration in connection with our school fairs. This question has been discussed quite seriously at several of our executive meetings, and while many are in favour of granting prizes of some kind, yet all are agreed that our present system has a tendency to lead to dishonesty among competitors. We hope to be able to formulate a new system for our fairs for 1919.

The school fair movement in this province does not date very far back, but ever since its introduction

small prizes have been offered at most centres. All prize money has been raised by the districts taking part in the fair. This money has been raised by private contributions, contributions by school boards, by funds raised at a concert held at some previous date, and by the sale of refreshments at the fair.

At all centres prize tickets, first, second, third and fourth, were supplied by this department. We find that at a number of centres these prize tickets were the only prizes offered and from reports received by those in charge at these centres, it has been emphasized that the competitions were just as keen as where money prizes were offered.

The school fair committees encourage the giving of special prizes by citizens of the school districts. This creates a great deal of interest, not only among the competitors, but also among the parents.

We might say then that all money given for prizes at the school fairs in this province is subscribed locally.

Prizes have also been offered to the members of our boys' and girls' clubs. For the past two years we have had a very successful potato-growing contest among the boys of the Prince of Wales College. The potato dealers of the province very willingly donated prize money. For 1917, the money was divided among the highest ten competitors

as follows: First, ten dollars, second nine dollars, third, eight dollars' tenth, one dollar. For 1918, we totalled the credits made by all the prize winners and divided the prize money according to credits made. Our prize money allowed us to make an allotment of one and two-third cents per credit. Thus, our first prize amounted to \$5.78, 2nd \$5.63, 3rd \$5.53 and 10th \$3.85.

This the members of the contest accepted as a fairer way to distribute the prize money, as each prize winner received proportionately according to the success of his work.

In connection with our poultry club competition, the P. E. Island Poultry Association contributed the prizes. The inter-club competition was held at the poultry show held in Charlottetown in January. The association gave prizes to the clubs making the best showing. Special prizes were also offered by citizens interested in children's poultry clubs. We anticipate that a greater interest will be taken in school club exhibits at our poultry shows from now on.

The school fair centre is taken as the centre for the organization of poultry clubs. In this way competition takes place between the club members at the school fair. The prizes offered for this competition is taken from the general school fair funds.

NOVA SCOTIA

BY L. A. DEWOLFE, B.A., DIRECTOR, RURAL SCIENCE SCHOOLS

MY experience convinces me that money prizes are necessary for school children's competitions. We have tried both ways with the same teachers and in the same community. We found that with ribbons or cards instead of money prizes, only about 75 per cent of the children exhibited. Some teachers can get children to do anything, whether any prizes are offered or not. With the rank or file, however, *money talks*. Furthermore the

parents take more interest if they know their children may win a money prize.

I think the prizes should be small. At practically all our exhibitions we offer 25, 20 and 15 cents as 1st, 2nd and 3rd prizes respectively. At a few county exhibitions prizes were \$1.00 or more, but there was no greater competition for these than for the 25-cent prizes. Apparently children compete for money, without considering how much money it is.

I think it wise to offer as special prizes books, etc., in addition to money, rather than in place of money. Ethically, perhaps, children should work for other things beside money; but in practice they are not inclined to do it.

We have found that practically all the prize money can be raised through local activities. Small admission fees, the sale of ice-cream, tea and cake, and guessing contests, have been used. In some cases the prize list is large enough to carry adver-

tising matter. For the last few years the government has contributed not more than 10 per cent of the total prize money paid. In towns the town council frequently votes part of the prize money. In rural districts the trustees occasionally vote a small amount from the school funds. Private individuals occasionally offer special prizes; but they are seldom asked to contribute to the regular prize list. So far as I know no banking institutions have helped along the school fairs.

NEW BRUNSWICK

BY THOS. HETHERINGTON, B.S.A., LIVE STOCK SUPERINTENDENT

MY experience with young people's clubs has been limited. The Pig Club work with farm boys was just begun in New Brunswick in 1917 and at the present time we have only twenty clubs, representing an approximate membership of two hundred.

Club fairs were held for the first time in the fall of 1918. In regard to prizes for these, my original intention was to look to several sources for this money, with the idea of making very generous awards. However, my attention was required for certain other phases of the departmental work, and the direction of the club fairs had to be delegated to others, with the result that the only source for prizes was that from a government grant of about \$300 or about \$15.00 per club. In arranging the awards, it was thought advisable to divide this money so that five boys at least could participate in the winnings.

The vital thing in these young people's clubs is to kindle a spirit of enthusiasm and rivalry; if this can be accomplished and maintained, the club is bound to flourish. To get this spirit it seems to me that the boy or girl must receive the support of the parents, i.e., the club movement must be heartily endorsed by the "grown-ups," and at the same time the grand climax, the fair or exhibition, as the case may be, must

offer an inducement worth contending for and of sufficient value that no effort will be spared in preparing and fitting for the event.

I believe that the closer these young people's fairs are patterned after the larger provincial fairs, the more attractive they will be to the youthful exhibitor, that is, just as generous cash prizes as possible, the usual ribbons, and a cup to be won twice or three times by the same exhibitor.

Many suggest that the prizes take the form of books, or a present of a purebred calf or pig, as the case may be. This, perhaps, is practical, but I think that boys like best to be treated as mature exhibitors are.

The source of the prize money is not, as a rule, a matter of choice, usually it is difficult enough to obtain it from any quarter. I think part should come from local sources, for instance, in the main our pig clubs are situated in districts served by agricultural societies and I had planned to look to these societies as a source of part of the prize money. Further, I think the Department of Agriculture, to show its interest in this work, should donate at least a part.

In conclusion, my idea is: Very generous cash prizes, equal to those at the leading provincial fairs, and this to be provided partly by local people and partly by the Department of Agriculture.

ONTARIO

BY J. B. DANDENO, PH.D. (HARV.), INSPECTOR OF ELEMENTARY AGRICULTURAL CLASSES

THE giving of prizes for school work of any kind may have some objectionable features depending to some extent on the methods of awarding such prizes. Theoretically it may be objectionable; practically it may not. Scholarships, prizes (whether in money or otherwise) and bonuses or awards of any kind, have been made use of from time immemorial, and we cannot get away from the fact, theorize how we will, that a considerable amount of good has resulted.

After all, prizes are simply recognitions of merit, partial rewards for faithful efforts, encouragement of industry, and, perhaps, most of all, a crowning of the victor. This last idea gives rise to the elements of objection, for the simple reason that the victor or winner may have had certain advantages in one way or another, not possessed by the others who compete. The victor may be crowned as a result of some handicap by his competitors. In this manner our sense of fair play is offended, and though without intention, harm may be the result.

But when we regard the matter in its widest sense we find the same element throughout all the walks of life. A man may be born with a handicap, mental or physical and, therefore, in the race of life, he fails to win the prizes. He may be handicapped by his environment; and the ordinary difficulties in which he finds himself may be unsurmountable, and he cannot win. His moral fiber may have been more nicely tuned, so that he recognizes finer shades of meaning between right and wrong and therefore fails to win a prize.

Prizes for work in education, such as those made use of in the school fair organization are, in many ways, the least objectionable of all, and they incorporate one especially good feature: As a rule the funds used in financing these prizes are contributed by the parents and others in the sections concerned, and this, of course, secures directly the interest of these people; and, whatever arouses the interests of the parents in the pupils of the schools, will always be praiseworthy. This method of managing prize-giving is simply a pooling of a certain amount of money in order to reward, to some extent, diligence and industry. There can be no doubt, taken as a whole, that the use of prizes in school fairs is commendable.

As to whether such prizes take the form of cash or goods, I am personally strongly in favor of the cash. It is convenient, easily adjustable and is free from the objection often noted,—receiving a prize in goods for which one has no use. By all means, therefore, for prizes for individuals make it money. It may sound harsh and mercenary, but it meets the case. For prizes for schools or classes, that is, for group prizes, such trophies as pictures, shields or cups should be used instead of money, largely because of their permanence.

The money value of the prizes for individuals need not be large. It is better to have a large number of small prizes than a few large ones. The more extended the list, the smaller the objection. Prizes for schools as a whole should, in a measure, be worth while, that is of considerable money value.

BY R. S. DUNCAN, B.S.A., SUPERVISOR, AGRICULTURAL REPRESENTATIVES

EVER since the inception of our school fairs, prizes of some kind have been offered for the competitive exhibits, events and features on school fair day. The

value of the awards would vary according to the nature of the exhibit or contest.

The object of giving prizes is to stimulate interest amongst the boys

and girls, to encourage a friendly spirit of rivalry and to act as an incentive for the boys and girls to put forth their best efforts to win the top-most place. There are cases where boys and girls would try their best to win first prize, merely for the sake of winning, for the honor it brings, regardless of any award. This is the spirit which should be engendered in the minds of our young people. In too many instances the actual value or amount of money won is considered of greater importance than the rank or standing in the competition or section or class of the prize list in which they are competing.

The value of the prizes awarded varies according to the number of sections or classes in the prize list and the amount of prize money available for distribution. The latter is usually the determining factor. In so far as school fairs are concerned, where there are a great number of competitors, it is highly desirable to offer a number of prizes, even if they are small, rather than a few prizes of larger amounts. The child with the simplest effort is then not overlooked. Prizes for live stock, manual training, sewing exhibits and nature collections should be greater than those offered for plot products, chickens, fruit and miscellaneous exhibits, because it takes longer to prepare these exhibits and moreover, some are the product of the pupil's own skill.

At the rural school fairs of Ontario prizes are provided for 1—potatoes, 2—roots, 3—vegetables, 4—corn, 5—other cereals, 6—flowers, 7—fruit, 8—poultry, 9—live stock, 10—manual training, 11—nature study, 12—home cooking, 13—sewing, 14—miscellaneous articles, and 15—contests. The prizes are small throughout. In classes 1 to 7, each of which includes several sections, the prizes are, first, 30c.; second, 25c.; third, 20c.; fourth, 15c.; fifth, 10c.; sixth, 5c.; and six ribbons. In the class for live stock, which includes foals, heifers, etc., the prizes are \$1.00 75c., 50c., and ribbons. For manual training, nature study, home cooking and sewing, the awards are 45c., 40c.,

30c., 20c., 15c., and 10c. In the miscellaneous class, which includes paintings and drawings, also driving contests for girls, the prizes are \$1.00, 50c., and 25c. The highest awards at these fairs are for the school parade, which is judged on marching, deportment, originality of design, decoration and song or school yell. The awards are \$3.00, \$2.00 and \$1.00.

Where there are sufficient funds available, the sliding scale method of awarding prizes gives the greatest satisfaction—more pupils would thus have the privilege of receiving a prize. In every instance, special ribbons indicating the prize won are awarded the pupils. These are appreciated as much if not more than the actual cash won. The cash is invariably spent on candy or such like, whereas the ribbons are prized greatly and are carefully put away in safe keeping. I do not think it necessary to award large cash prizes. In fact, one fair reported that only ribbons were awarded and it apparently did not detract from the success of the fair. It would tend to make the pupils more self reliant and less selfish.

Besides the individual prizes offered at school fairs, special school prizes have been given for a boys' stock-judging competition, composed of three boys from each school in the school fair district; for the best school exhibit prepared by the teacher, trustees and pupils in the district; for the best school collection of art and for the school winning the greatest amount of prize money. The effect of these school prizes is really wonderful. They encourage all in the district to take a lively interest in the fair, which is purely educational in character, and from the fact that boys and girls become enthused about their fair, the teachers in nearly every instance report more interest in their school studies.

Sports are always conducted on school fair day and prizes are awarded in the form of ribbons only. In some instances, however, the hat is passed and money collected to give small

cash prizes for races, jumps and contests. This is the exception and not the general practice. A few of the trustees seem to think small cash prizes will stimulate interest in the sports. It is not a good practice to professionalize pupils for races and personally, I believe there is absolutely no necessity for anything but ribbons for such events. The pupils should enter the sports for their own physical welfare.

The character of the awards depends very largely upon the nature of the exhibit or the competition conducted. Ribbons are offered in all school fair events and in addition, small cash prizes for all individual sections. Sweepstakes or championship prizes for individuals usually take the form of medals, cups or books. In some instances, special prizes have been awarded in the form of a Jersey calf, an Ayrshire calf or a bacon pig.

School prizes for a live stock judging competition, apple naming contest, weed naming contest, where pupils from each school compete, usually consist of books for the library; shrubs to beautify the school grounds; silver cups or shields suitably engraved to be kept or hung in the school. These prizes would be awarded also for a school exhibit, such as, (a) collections and display, (b) greatest prize money won, (c) for the school having the greatest number of pupils competing in the various events.

Prizes such as books and medals are usually offered the students in the special courses in agriculture, for the following:—

- (a) Stock judging contest.
- (b) Best essay submitted on subject assigned.
- (c) General proficiency.
- (d) Best packed box of apples.
- (e) Public speaking competition.

In the various competitions, such as acre profit, feeding hogs, baby

beef, dairy profit conducted by the Junior Farmers' Improvement Associations, prizes are awarded in the form of courses of instruction at the Ontario Agricultural College.

Those winning in the above competitions have their expenses, transportation and board paid, while attending two weeks of any of the short courses at the College during the winter months.

All prize money for the rural school fairs is contributed locally. The trustees from each school section give a grant of from \$3.00 to \$25.00, depending upon the number of pupils on the roll. The township council usually gives a grant of from \$5.00 to \$25.00 and the county council in some instances gives quite generously towards the prize list. Members of parliament, public spirited persons, merchants and banking institutions also contribute largely in some districts. Even the women's institutes, boards of agriculture and agricultural societies make special donations to assist with the prize list.

School prizes in the form of cups and shields are usually contributed by the banks or from the funds of the rural school fair association. Such cups or shields usually must be won three times before becoming the property of any one school.

The government does not in any case contribute towards the prize money for school fairs. Occasionally funds from what is generally known as the county grant are used for small prizes in a young men's live stock judging competition or public speaking contest held under the auspices of the Junior Farmers' Improvement Association. The government sets aside a special appropriation for the payment of transportation and board of the winners in the various competitions, taking the two weeks' course in agriculture at the Ontario Agricultural College.

MANITOBA

BY S. T. NEWTON, DIRECTOR EXTENSION SERVICE

THE giving of cash prizes in Manitoba has always been a matter for discussion, there being many who consider the giving of prizes a sort of ulterior motive and hardly to be encouraged. Personally I am strongly in favour of prizes, and this year the following prizes were distributed:—

1. Cash prizes of which one-third were paid by the Department of Agriculture from provincial funds.

2. A free trip to the Agricultural College for the boy or girl who raised the best pair of pigs in each inspectorial division, donated by the Swine Breeders' Association.

3. The Eaton Prize, of a trip to the Agricultural College for the boy or girl who made the best showing in the same district in gardening and poultry raising.

4. There are twelve bank managers in charge of strong boys' and girls' clubs, and they are giving a free trip to the member of their club who makes the best showing in pig raising.

5. The milling companies are giving \$350.00 worth of special prizes to be competed for in Winnipeg during farmers' week. The two winners in the bread baking contest at each

fair sends a loaf to the provincial competition.

6. In the gopher campaign club, members get two cents for each gopher tail presented at the school.

A few of the clubs purchased books and gave them as prizes, but they were not nearly as popular as cash prizes. The average boy or girl who faithfully works all summer on his project feels that if it is good enough to win a prize that he has judgment enough to spend the money in the way that gives him most satisfaction.

The intention this year is to pay the prizes in thrift stamps, and as many club members are interested in pig, calf and sheep raising, a number will be able to buy a bond. I believe that the giving of thrift stamps instead of the regular cash prize will remove most of the objection to the giving of money prizes. In Manitoba the department of agriculture is paying 50 per cent of the amount of money actually paid out for agricultural, home economics and school exhibits. The various clubs, however, will undertake to supply their own seeds, eggs, etc.

SASKATCHEWAN

BY JOHN G. RAYNER, B.S.A., DIRECTOR OF BOYS' AND GIRLS' CLUBS

THE question of granting prizes to boys and girls for achievement in contest work, and the value and character of such prizes, is a fundamental and far reaching problem. The answer in part depends upon the purpose underlying the work. Essentially its ultimate object is to make better boys and girls and the question is should we put a price on work done by the boy or girl as a part of his or her education. Is there any more legitimate reason for granting a prize for a well prepared exhibit for a club or school exhibition than for a reading lesson

well prepared? A prize in reality works out as a price on the effort to do things well. If a piece of work is done well, the boy or girl receives a reward, perhaps in the form of profit as in the case of raising pigs or calves, or should the exhibit have no currency value there is indeed an improvement in the talents of the exhibitor and an increase in personal power. There can be no greater prize than the consciousness of having done a thing well. One of the greatest evils at our fairs is that of exhibiting largely for the purpose of winning the prize and not from the natural desire to

excel. However, there is considerable difference between the theory and the practice in prize giving, and so long as the prize provides incentive to do commendable work and the good thus done outweighs the objections, the prize in some form will be continued.

With only one year of club results to judge from it has not been possible to fully observe first hand what seems best in the matter of granting prizes. However it has been observed that the measure of the prize offered is no gauge as to the interest which is taken. The boys and girls possess a natural desire to excel and it is our duty to see that the desire is not dulled by encouraging the mercenary spirit in exhibition work. Our advice to the clubs in Saskatchewan is to make the prizes small and numerous rather than few and of larger denomination.

As to the character of the prizes favour will be granted to ribbons, medals, scholarships, diplomas, trips to educational centres, and boys' and girls' camps. Scholarships and trips will be used as sweepstakes prizes for district winners. The ribbon prize has been used considerably with the school exhibitions of the province

and there has been no lack of interest in the work. The educational prizes will be largely encouraged. Most of the money used for prizes will come from grants from school boards, municipalities, agricultural societies, etc., and from private donations. The prizes offered by the Canadian Bankers' Association are made use of at many points and supplementary to regular prizes most of the fairs secure special prizes of various characters from societies, merchants, banks, etc., etc.

Our plan will be to use the prize as seems necessary to make for successful work but to eliminate any possibility of its being the end in view to the exhibitor. Rather we will encourage the desire on the part of exhibitors to do their best from the sheer joy of excelling. Financing is one of the great problems with which the agricultural societies have to contend and we hope to avoid this in the junior work by eliminating the cash prize as largely as possible. This will lessen the troubles of the club executives and will eliminate largely the danger of commercializing contest and exhibition work among our young people.

ALBERTA

BY J. G. TAGGART, B.S.A., INSTRUCTOR IN SCIENCE, SCHOOL OF AGRICULTURE, OLDS

COMPETITIONS for boys and girls conducted by the Alberta Department of Agriculture are of two kinds, namely, school fairs and pig clubs.

At the school fairs the children exhibit foals, calves, poultry, field crops, garden products, cookery, sewing, canning and in some instances map drawing, writing, reading and raffia work. Major emphasis is placed on strictly agricultural products.

In all classes excepting live stock there are two competitions. First the exhibitors compete only with other children from the same school. In this competition suitable printed ribbon prizes are awarded by the

Department. In the second competition the prize winners in all of the schools participating are brought together and money prizes are awarded.

The value of the prizes in the latter competition are approximately as follows:—1st \$1.50, 2nd \$1.00 3rd 75c., 4th 50c.

At some fairs the number and amounts of prizes for live stock are proportional to the number of entries.

Up to the present the Department has borne the greater part of the expense of the school fairs, local people and organizations being required to raise only about one half of the money distributed as prizes.

A somewhat different plan of financing the fairs is now under consideration in which it is proposed that the Department shall supply seeds, ribbons, judges and do the printing, while the remainder of the expense including all of the cash prizes shall be raised locally. It is possible that the school boards will contribute most of the money required for prizes.

The pig clubs are organized and directed by the Department and financed by the banks. The banks loan money to boys and girls for the purchase of pigs. When the fair is held the banks contribute the greater part of the interest on the loans toward the prize list. The Department contributes no money, but prints circulars and prize lists.

LIVE STOCK ASSOCIATIONS

BY E. L. RICHARDSON, SECRETARY, LIVE STOCK ASSOCIATIONS

FOR a number of years the Alberta Live Stock Associations have introduced competitions to encourage boys and girls to take a greater interest in live-stock raising. To this end we have provided, at our winter fairs, boys' and girls' baby beef, heifer, and lamb competitions. We have provided corresponding classes at our summer exhibition for light and heavy yearling horses, beef and dairy yearling cattle, sheep, swine, and poultry. In both of these series of competitions very generous prizes have been offered. At the summer fairs, however, the competitions were hardly sufficient to warrant the expenditure of the money. Possibly the season of the year was less favourable than the winter season, when the junior competitions provide a special feature of the fair.

The competitions are open to girls and boys, residents of Canada, nine years or over and under seventeen years on the last day of the exhibition. One entry only may be made by an exhibitor in a class. While the animals may not necessarily be the property of the competitors, they must have fed, cared for, and fitted them from the beginning of September to the date of shipment to the exhibition, and the animals must personally be exhibited by the competitor.

In the lamb competition, fifteen prizes were offered, ranging from \$75 to \$5. In the baby beef competition \$1,500 was provided in two open

classes and \$775 in the several special classes, in addition to a \$250 challenge shield. This money was provided by business firms, private individuals, and breed associations. In the baby beef competition, for example, \$1,500 was divided *pro rata* according to the actual number of animals shown in each class and then paid in each class by percentages: 1st prize, 17 per cent of the money offered; 2nd prize, 15 per cent; 3rd prize, 13 per cent; 4th prize, 11 per cent; 5th prize, 9 per cent; 6th prize, 7 per cent; 7th prize, 5 per cent; 8th prize, 5 per cent; 9th prize, 4 per cent; 10th prize, 4 per cent; 11th prize, 3 per cent; 12th prize, 3 per cent; 13th prize, 2 per cent; 14th prize, 2 per cent. In this competition also a challenge shield as well as a gold medal was presented to the winner, and a silver medal to the winner of the second prize. In the bacon hog and yearling ewe and wether competitions, taken part in by boys and girls, five prizes are given for each section, ranging from \$12 to \$2.

In addition to the good money prizes offered, watches and medals were donated. Among the girls, one competitor won \$162.22 and a gold watch, another \$137.78 and a gold medal, while others won corresponding smaller amounts. Among the boys, \$232.02 was won by one lad in addition to the challenge shield and a gold medal, while another farmer's son won \$184.98 and a gold medal.

The value of these large prizes was demonstrated in the excellent competition they brought out. At the last winter fair these classes brought out 198 entries and provided a special feature of the fair. It is firmly

believed from the interest taken and the excellence of the stock shown, that a number of the competing boys were so encouraged as to make them better stockmen than they would otherwise have been.

DISTIBUTION OF EGGS TO SCHOOL CHILDREN

NOVA SCOTIA

BY J. P. LANDRY, MANAGER AND LECTURER, POULTRY DEPARTMENT

WE expect to follow the same method of distribution of eggs to school children as was carried out in 1918. A circular letter is addressed to the school inspectors in the different districts of the Province asking these inspectors to forward the names and addresses of fifteen of their teachers to whom we can supply four settings of eggs for the pupils in these schools. Upon receipt of these letters the teachers are written to for a list of the pupils who will take care of the eggs in the schools and each pupil is required to bring to the school teacher 40c. in payment for the setting of eggs. Upon receipt of the letter the orders are entered in our book and filled as soon as possible after March 15th. We prepay expressage on the eggs to the teacher who in turn distributes

them to selected pupils. We do not organize any clubs in connection with this work but ask the teacher to report the results of the hatch to this office.

The source from which we obtained the eggs are our own poultry plant and a number of breeders' pens in the Province who have made a particular selection of their stock.

We also are extending this work to include the Agricultural Representatives in the Province who may select the schools and organize the club to whom we supply 10 settings of eggs per club. The Agricultural Representative will make this distribution of these eggs for the school club. We have some seven Agricultural Representatives at present in the Province and we expect at least one or two clubs may be organized by each Representative this year.

NEW BRUNSWICK

BY R. P. STEEVES, M.A., DIRECTOR ELEMENTARY AGRICULTURAL EDUCATION

THE plans for handling the school fair project work in New Brunswick will be slightly modified this year. No club will be recognized that has less than six members, all of whom must be pupils enrolled in the schools. In order to secure recognition and be supplied with eggs, clubs are required to notify the Director of Elementary Agricultural Education before April 1. Members may, if they desire, supply eggs themselves. Not more than one setting of thirteen eggs will

be supplied to each member desiring them. The Barred Plymouth Rock breed will be used again this year, but other varieties will be furnished on special request.

To secure the eggs the member must agree to pay eighty cents before the end of October next. A supervisor will visit each member of a club some time during the summer to inspect the brood and to make a record of the conditions in which they are kept. Each member is required to keep a close record of the work,

make observations during the season, and be able to prepare a composition upon it at the end of the season. This is to be forwarded, along with the payment for the eggs.

Distribution of eggs will be com-

menced about the 15th of April and will be continued in the order in which applications are made. The eggs for all the members of a club will be sent in one shipment addressed to the teacher.

QUEBEC

MACDONALD COLLEGE

BY A. G. TAYLOR, B.S.A., POULTRY DEPARTMENT

HATCHING eggs are supplied to the school children each spring by the Poultry Department with the assistance of the Quebec Department of Agriculture. The conditions under which these eggs are supplied are: Each child receiving a setting of eggs must promise to follow carefully the instructions given out throughout the year, to show all the chickens hatched from the setting of eggs received at the school fair in September, and to use in the breeding flock, on his or her father's farm, the pullets from the setting of eggs together with a desirable male, and in this way improve the value of the farm flock. The children, in a large number of cases, breed from the pullets hatched from College eggs and in this way establish a pure-bred flock in two or three years.

Eggs are supplied to all schools in counties where the Rural School Department of Macdonald College is working, and also in various counties through the assistance of the agricultural representative of the Quebec Department of Agriculture.

These eggs are produced by demonstration flocks, which are under the supervision of the writer. The flocks are located in different parts of the province, are all of desirable utility type and of one breed—Barred Plymouth Rock. The females are all of Macdonald College strain and the male birds heading these pens were raised at the College and are of our best laying strain. Male birds are sent out yearly to head these flocks. Each flock is visited twice or three

times each year and carefully inspected, any undesirable breeders being removed before the breeding season commences.

The hatching eggs are delivered by the Rural School Department's representative or by the agricultural representative in the various counties. Some of the eggs are delivered to the office of the agricultural representative in the district, and others are shipped to the College. This work is so arranged as to deliver the eggs to the children as soon after they are laid as convenient and with as little shipping as possible. Eggs are delivered to the children in person in nearly every instance. A few are delivered by parcel post and with fair results.

Each demonstration flock has a number and every egg sent out for hatching by that flock bears the flock number. In this way we are able to keep a hatching record of each and every flock. These flocks are placed with the leading farmers in each community as nearly as possible and have given universal satisfaction in the past. New flocks are being added each year as the distribution work warrants, while a number of the flocks already established have increased in size.

As the work increases in volume and with the increased interest in poultry work, which seems to be more marked each year, we hope in the near future to have breeding centres established where Barred Plymouth Rock hatching eggs can be secured in large numbers and at a price within reach of every one.

MANITOBA

BY S. T. NEWTON, DIRECTOR AGRICULTURAL EXTENSION SERVICE

WHEN Boys' and Girls' Clubs were organized some years ago, chicken-raising was one of the principal contests, and as there were only some seven clubs in the province, it was possible to get most of the eggs from the Manitoba Agricultural College, and one dozen of these were supplied to each club member. The rapid increase in the number of members from 750 to 25,000 made it impossible for the Agricultural College to supply more than one per cent of the eggs required during the past year, and an effort was made to get eggs from the best poultry-raisers in the province.

For the first four years eggs were supplied free. During the next year they were supplied free to new clubs, and last year a charge of 40 cents a dozen was made, the other 60 cents a dozen being paid for by the Department.

As it was not possible to get a sufficient number of any one breed to meet the needs of club members throughout the province, and, further, there seemed a strong disinclination in some districts to having any breed of poultry other than that already being raised in the district, we respected their prejudice and endeavoured to get eggs of the same breed as that predominating in the district.

We tried having eggs shipped direct

from one district to another without having them come to Winnipeg, but this did not work out satisfactorily, consequently we had the eggs shipped to Winnipeg, generally in twelve dozen lots. They were repacked the same day, and sent out to club managers throughout the province.

Possibly no feature of Boys' and Girls' Club work has proved less satisfactory to the Department of Agriculture, for while there are thousands of fine flocks in the province which can be traced directly to eggs sent out by the Department, still more was expected of eggs which we sent out than could reasonably be expected of any eggs. There would probably be two dozen settings that gave entire satisfaction, and probably one setting that was not satisfactory. We usually heard of the one setting, but never heard of the many good settings.

The consequence is, that this year we are not supplying any eggs free, or partially free. As a matter of fact, we are not supplying any material free, or partially free, as we believe there is sufficient good foundation stock in the province to make the further distribution of this material unnecessary, and our main effort will be centred in giving assistance to the various clubs throughout the province in perfecting their organization.

SASKATCHEWAN

BY J. G. RAYNER, B.S.A., DIRECTOR BOYS' AND GIRLS' CLUBS

THE poultry-raising contest will be encouraged again this year as one of the prominent boys' and girls' club activities. No arrangements will be made, however, for supplying eggs to members other than an endeavour to recommend reliable sources of supply. The clubs will be urged to exercise care in the choice of breeds, having regard

for the breeds most commonly kept in the district and also for the recommendations of the Poultry Department of the University. Where feasible only one breed will be used in each district. The clubs will also be urged to secure eggs locally if suitable settings can so be obtained.

The Poultry Department of the

University co-operating with the Extension Department had planned to send experts throughout the province to cull and grade poultry flocks and to make recommendations as to their mating. It was then the intention to compile a list of these inspected flocks and to recommend them as reliable sources of egg supply. Unfortunately, owing to limited staff and to the "hold-up"

caused by the influenza epidemic, very little of this work has as yet been done. It is hoped, however, that by next season inspection will be widely carried out and while its primary purpose is the improving of the poultry industry of the province it will also make available for the clubs information as to reliable poultry breeders from whom to obtain hatchings.

ALBERTA

BY H.W. SCOTT, DEPARTMENT OF AGRICULTURE

THE Alberta Department of Agriculture has for the present at least, decided to discontinue supplying eggs to children for school fair work. A number of factors have contributed to this decision.

Transportation by railway and over country roads to the school house and by the pupils to their homes has been found to have a decidedly detrimental effect on the hatching qualities of the eggs and on the vitality of the chicks. The children receiving the eggs are attending school and are not in a position to give the young chicks the needed attention, consequently the educational feature of the work is to a large extent lost to the pupil. Further, the school fairs are generally held at the school or in a hall in the town where there is no storage facilities for carrying over the exhibition coops from year to year; the coops are bulky, awkward and expensive to transport from one fair to another. These factors make the

exhibiting of the birds at the fair an added problem.

The difficulties mentioned might be overcome if the Department found they were adopting the proper course to encourage the young people to keep higher producing strains of poultry and to give their poultry better attention. On investigation it was found that in some cases the stock grown from the eggs distributed were kept separate during the breeding season and the eggs laid by these birds were used for hatching purposes, but in the majority of cases, this was not done. From a setting of eggs there is possible only a limited number of pullets, trap nesting is not a general practice on the farms and the expense of a separate breeding pen for these few birds is not considered by the majority of the parents as justifiable. The final result has been that in most cases, birds hatched from the eggs distributed soon lose their identity in the larger farm flock.

BRITISH COLUMBIA

BY J. W. GIBSON, M.A., DIRECTOR, ELEMENTARY AGRICULTURAL EDUCATION

WE have never made a feature of the distributing of eggs to those children engaged in school agriculture. In our suggested list of home projects in rural science, the raising of chickens

by boys and girls at their homes is suggested under certain conditions in lieu of home gardening.

The following statement appears in a further circular dealing with elementary education:—

"In cases where it is difficult for pupils wishing to undertake the poultry-hatching project to get suitable eggs for hatching, the School Board may purchase these

for a limited number of pupils and include the cost of the eggs in the financial statement supplied to the department in December."

SASKATCHEWAN

SOCIAL AND CULTURAL EXTENSION WORK AT STRASBOURG

FROM H. C. SANDERCOCK, B.A., PRINCIPAL, HIGH SCHOOL

THE following account is interesting mainly as an indication of what can be done in the way of extension work with the most ordinary resources of the community.

The writer found here on September 1, 1918, a good school which appeared to be merely badly run down. With the rank of a high school, it had not the enrolment to qualify. Inquiry revealed the fact that there was the usual proportion of young people of high school age in the district, yet only four students had graduated from the public school in July, and of these only two entered the high school. Interest seemed dead, even on the playground, and for the very good reason that there was nothing to play with. The school board seemed earnestly anxious about the state of affairs, and readily fell in with the proposal to erect swings, and other apparatus at a cost of fifty or sixty dollars for material. For permanence and better service all posts were set in cement, the writer with a crude knowledge of wood-work doing the work of construction. The effect was instant and lasting. It is indeed a severe day even now in the winter when the swings and giant stride are not fully occupied, and the benefit is evident in the lively buoyant steps and rosy cheeks of the boys and girls.

Very early I made the acquaintance of the Union minister, and found in him an interest in social work, a viewpoint, and a capacity for collaboration and for rising above prejudice which were of utmost value. Partly by his help I became familiar

with the country of which this town is a mere trading centre. And when my plans for a class in agriculture began to take shape and I began to canvass for boys, Mr. W. gave me the opportunity to present the matter at his Sunday services in the country.

Weekly paragraphs in the local paper advertised the idea. To secure a social contact, a "Bean Feed" was announced for Hallowe'en, but after the invitations, drawn and coloured by hand, had been sent out, "flu" upset all our plans.

But "flu" gave us an unprecedented opportunity for an organized social effort. The school became a hospital. Equipment of all kinds was furnished without stint by the citizens from their own homes. Country teachers and other young women flocked in as volunteer nurses, country folk brought food, townsfolk cooked it. Sixty or more patients we treated in the hospital, dozens of others outside. Then our nurses, schooled in treating the malady scattered far and wide into stricken homes. And when it was over the people gave us a public function in the town hall and presented us with gold pins engraved: "For Service, Strassbourg Emergency Hospital, 1918."

Once more school opened, and belated plans were set afoot. What to do with the boys in the evening was our first care. Mr. W. and I again worked together. Eighteen boys gathered in his home to organize a Sunday class. A citizen who had some knowledge of gymnasium work had been enlisted, and with his

assistance a club was formed to hold regular classes in the town hall which the mayor allowed us to use. This now meets regularly. Skating and hockey fill two or three nights and the picture show runs every night.

Within the school the agriculture time table has been dove-tailed into the other high school work so that my assistant and I are able to carry it. Ten boys are taking the class. Every effort is made to utilize the resources of the community, and every few days some new resource is discovered, a man who can box or wrestle, a man who is a poultry enthusiast, or a married woman who had trained as a nurse. For literature dealing with agricultural topics we depend largely on government publications. Local men come in and give lectures or demonstrations in milk testing, common ailments of farm stock, poultry points, stock judging, or the farm aspects of contracts, deeds, mortgages, and wills. Twice a week the class is sent to the blacksmith shops, half to each shop, to be instructed in simple iron work. A beginning was made with a carpenter, but he had to leave us to attend to his own work.

A vacancy occurring in the public school staff, a graduate in domestic science has been engaged. A dozen grown up girls from the banks, offices and stores have signed the roll for a night class in household science. Most of these girls also desire first aid work. To this end, the two local doctors have agreed to give the lectures and examination of the St. John's Ambulance Association, and the trained nurse above mentioned will give the girls practice in bandaging.

The fine point about all these lines of activity is the clear view that every one has of the social aspect of the work. Some, of course, talk more about this than others. But nobody ever talks about being paid for what he does. He regards it as a contribution which it is a privilege and an honour to make. Other larger objects are taking form. We want a hospital and we want a library. Some day we may want an agricultural high school. If we never get any of these things, at least an atmosphere of social effort is a good one for boys and girls to grow up in. They will make better citizens, and will be happier men and women in private life.

"Nature study is not elementary science as so taught, because its point of attack is not the same; error in this respect has caused many a teacher to abandon nature study and many a pupil to hate it. In elementary science the work begins with the simplest animals and plants and progresses logically through to the highest forms; at least this is the method pursued in most universities and schools. The object of the study is to give the pupils an outlook over all the forms of life and their relation one to another. In nature study the work begins with any plant or creature which chances to interest the pupil. It begins with the robin when it comes back to us in March, promising spring; or it begins with the maple leaf which flutters to the ground in all the beauty of its autumnal tints. A course in biological science leads to the comprehension of all kinds of life upon our globe. Nature study is for the comprehension of the individual life of the bird, insect or plant that is nearest at hand."

A. B. Comstock.

PART IV

Special Contributions, Reports of Agricultural Organizations, Publications, and Notes.

ASSOCIATIONS AND SOCIETIES

EVENTS OF THE COMING MONTHS

- Feb. 27, Annual Meeting Prince Edward Island Dairy Association, Charlottetown. Secretary T. J. Profitt, Kensington, P.E.I.
- Feb. 26, 27, Alberta Dairy Convention, Calgary. C. P. Marker, Dairy Commissioner.
- Mar. 1, Annual Meeting British Columbia Entomological Society, Vancouver. Secretary, Williams Hugh, Cloverdale.
- Mar. 4, Annual Meeting Canadian Red Polled Association, Brandon. Secretary, Miss E. J. Smale, Brandon, Man.
- Mar. 4, 9, Manitoba Winter Fair, Brandon. Secretary, W. I. Smale, Brandon.
- Mar. 5, 6, Annual Meeting Alberta Provincial Live Stock Associations, Edmonton. Secretary, W. J. Stark, Edmonton.
- Mar. 7, Annual Meeting Canadian Aberdeen Angus Association, Brandon. Secretary, W. I. Smale, Brandon.
- Mar. 7, Annual Meeting Manitoba Poultry Association, Brandon. Secretary, W. F. McGuinness, Brandon.
- Mar. 8, Annual Meeting Canadian Flax Growers' Association, Toronto. Secretary, R. L. Defries, 15 Toronto St., Toronto.
- Mar. 9, Annual Meeting United Farmers of New Brunswick. Secretary, Frank Everett, Jacksonville, N.B.
- Mar. 11, 12, Canadian Council of Agriculture, Winnipeg. Secretary, Norman P. Lambert, Winnipeg.
- Mar. 12, 13, Saskatchewan Stock Sales, Regina. Secretary, A. M. Shaw, College of Agriculture, Saskatoon.
- Mar. 12, 14, Annual Meeting Nova Scotia Farmers' Association, Truro. Secretary, C. R. B. Bryan, Truro, N.S.
- Mar. 13, Annual Meeting Nova Scotia Poultry Association, Truro. Secretary, J. P. Landry, Truro.
- Mar. 13, Annual Meeting New Brunswick Fruit Growers' Association, Fredericton. Secretary, A. G. Turney, Dept. of Agriculture, Fredericton.
- Mar. 21, Annual Meeting Canadian Belgian Draft Horse Breeders' Association. Secretary, J. A. Paquet, Dept. of Agriculture, Quebec.
- Mar. 21, Annual Meeting Quebec Society for the Protection of Plants. Secretary, Prof. J. M. Swaine, Entomological Branch, Ottawa.
- April 2, Pure Bred Bull Sale, Edmonton. Secretary, W. J. Stark, Edmonton.
- April 3, Pure Bred Horse Sale, Edmonton. Secretary, W. J. Stark, Edmonton.

LIVE STOCK RECORD ASSOCIATIONS

The annual meetings of the Canadian Live Stock Record Associations were held in Toronto during the week commencing February 3d. A feeling of decided optimism

prevailed throughout the meetings. The transactions of these organizations through the National Live Stock Records are shown in the following tables:—

PEDIGREES AND TRANSFERS RECORDED DURING FIVE YEARS

Association	Pedigrees Recorded					Transfers Recorded.				
	1914	1915	1916	1917	1918	1914	1915	1916	1917	1918
Aberdeen.....	1541	1255	1431	2567	3841	761	797	1103	1448	1849
Ayrshire.....	3496	3682	4000	4368	4475	1364	1407	1976	3205	3847
Belgian.....	132	76	131	241	508	83	96	94	169	245
Brown Swiss.....		432	270	57	214		4	23	25	23
Clydesdale.....	2900	2555	3132	3885	3526	2773	2255	3266	3715	3819
Dogs.....		877	1542	1661	2628		183	1224	1428	1477
Canadian Cattle.....	338	319	268	327	351	117	124	141	199	188
French Coach.....	19	10	7	2	4	5	14	10	5	7
Canadian Horse.....	53	85	64	52	53	15	51	30	23	28
Galloway.....	91	63	30	19	111	7	22	45	6	52
Goats.....					230					41
Guernsey.....	154	230	146	183	159	35	39	88	55	62
Hackney.....	101	128	94	77	93	129	142	132	123	122
Hereford.....	2543	2147	3207	5353	5228	869	769	1087	1971	3149
Jersey.....	1215	1065	1308	1703	1519	732	887	1014	1151	1297
Percheron.....	962	825	1323	2304	3597	486	493	642	913	1161
Pony.....	228	67	69	40	68	25	31	32	25	23
Red polled.....	102	80	477	331	294	37	45	52	94	63
Sheep.....	4826	6019	7958	8411	10255	1372	1376	2509	3874	4574
Shire.....	135	93	121	158	178	93	79	107	149	112
Shorthorn.....	10186	11135	14333	16863	17409	5813	5063	6987	9414	11859
Standardbred.....	361	319	382	324	289	164	157	192	164	252
Suffolk.....	31	35	28	34	31	29	13	32	37	21
Swine.....	14441	9718	13594	12204	14858	1916	1507	3493	9270	11780
Thoroughbred.....	194	219	151	158	177	69	59	91	89	59
Totals.....	44049	41434	54066	61322	70096	16894	15613	24370	37552	46110

MEMBERSHIP OF RECORD ASSOCIATIONS

	Ont.	Man.	Sask.	Alta.	B.C.	Que.	N.B.	N.S.	P.E.I.	U.S.	G.B.	Nfd.	Totals
Aberdeen Angus.....	134	70	89	90	3	7		1	3	1			398
Ayrshire.....	447	26	38	58	36	792	46	54	28	9		3	1537
Belgian.....	2	6	30	19		11				1			69
Brown Swiss.....	6		1			12							19
Clydesdale.....	954	315	386	256	32	54	12	12	7	1			2029
Canadian Cattle.....	1	1			1	139	1						143
French Coach.....			1	8									9
French Canadian Horse.....						92							94
Galloway.....	1	1											15
Goat.....	2	5	2	6									36
Guernsey.....	6	1	1	1	25			2					63
Hackney.....	8				15	6	3	26	5				117
Hereford.....	57	8	7	23	4	10	1	1		5	1		596
Jersey.....	199	81	119	164	4	8		6	2	13			426
Kennel.....	211	16	15	19	71	59	11	18	4	2			1235
Percheron.....	675	86	85	75	121	133	21	10	2	27			556
Pony.....	88	53	177	220	1	9	1	2	1	4			56
Red Polled.....	27	2	5	8	3	11							50
Sheep.....	15	16	13	5				1					1355
Shire.....	469	81	107	118	26	463	22	29	26	14			66
Shorthorn.....	20	8	8	25	4					1			3177
Standard Bred.....	1596	414	356	395	24	102	24	40	19	7			151
Suffolk Horse.....	59	9	31	24	6	15	3	2	2				13
Swine.....	1		4	8									2259
Thoroughbred Horse.....	498	224	459	450	78	475	30	20	22	3			106
	66	1	4	20	4	11							
Totals.....	5727	1423	1941	2000	463	2409	175	224	121	88	1	3	14575

DOMINION SHORTHORN BREEDERS' ASSOCIATION.

At the thirty-fourth annual meeting of the Dominion Shorthorn Breeders' Association every province except British Columbia was represented. The secretary's report

showed receipts of \$50,800 and a balance of \$20,000. It was voted to grant \$6,000 for exhibitions and \$1,000 for special prizes. The secretary was authorized to expend up to \$10,000 in publicity and extension work. The following amendments to the constitution were adopted:

Persons in arrears for membership fees for three years or more shall be required to pay full arrearages in order to renew membership in the association;

That provision be made for the registration by members of the association of herd and farm names at a charge of \$1 each;

An amendment to the registration rules places the fees for registration to members, for animals under 12 months, \$1 for each animal; to non-members, for animals under 12 months, \$2 for each animal; to all, animals over 12 months and under 5 years, \$10 for each animal. This rule will go into force on January 1st, 1920.

The following officers were elected: President, W. A. Dryden, Brooklin, Ontario; 1st vice-president, J. F. Mitchell, Burlington, Ontario; 2nd vice-president, J. G. Barron, Carberry, Manitoba; secretary-treasurer, Geo. E. Day, Guelph, Ontario.

CANADIAN JERSEY CATTLE CLUB.

At the annual meeting of the Canadian Jersey Cattle Club it was announced there are 221 Jerseys in the Canadian Record of Performance test. It was announced that arrangements have been made with the American Jersey Breeders' Association for reciprocity between that association and the Canadian Jersey Cattle Club for the acceptance of each other's records.

The following officers were elected: President, E. H. Barton, Chilliwack, B.C.; 1st vice-president, J. Lee Alexander, Hillhurst, Que.; 2nd vice-president, George Bagge, Edgerley, Ont.; secretary-treasurer, B.A. Bull, Brampton, Ont.

CANADIAN HEREFORD BREEDERS' ASSOCIATION.

The Canadian Hereford Breeders' Association amended the rules of registration so that a female must be twenty-seven months old when she drops her first calf before the calf can be registered.

The following officers were elected: President, L. O. Clifford, Oshawa, Ont.; vice-president, W. H. Hunter, Orangeville, Ont.; secretary-treasurer, H. D. Smith, Ancaster, Ont.

HOLSTEIN-FRIESIAN ASSOCIATION OF CANADA.

At the annual meeting of the Holstein-Friesian Association of Canada it was reported that pedigree registrations for 1918 showed an increase of 1,000 and the transfers, 1,500. A resolution emanating from the British Columbia Holstein-Friesian Association was passed requiring that cows, in order to register in the Canadian Record of Performance, shall give not less than four hundred pounds of butter fat.

The association has entered into an agreement with the Holstein-Friesian Association of America to accept each other's registration certificates. Under the new system cattle entering the United States from Can-

ada shall be registered in the Holstein Herd Book of America, provided they are accompanied by certificates showing they are already registered in the Holstein Herd Book in the country of origin. In like manner cattle entering Canada from the United States shall be registered in the Canadian Holstein Herd Book, when the American Association certificates are produced. Registration of ancestors in these cases are not necessary.

A resolution was passed permitting a bull to be recorded in the Record of Performance when he has four proven progeny, not of necessity daughters.

That the action of the president and secretary in offering thirty dollars in prizes in the judging competition at the Guelph Dairy School, thirty dollars in the boys', and girls' calf feeding competition at the Edmonton Spring Fair and one hundred dollars in bull calf classes at the Ottawa winter fair be approved.

By resolution the secretary was instructed to supply exhibitors of Holstein-Friesian cattle at Toronto during the last two years with a form on which they are asked to pledge themselves not to exhibit in their own names at Toronto or other large exhibitions, cattle of which they are not bona-fide owners.

The Association decided to join both the Eastern and Western Canada Live Stock Unions.

The following officers were elected: President, Dr. S. F. Tolmie, M.P., Victoria, B.C.; 1st vice-president, F. R. Mallory; 2nd vice-pres., Neil Sangster, Ormstown, Que.; 3rd vice-pres., G. A. Brethen; 4th vice-pres., A. E. Hulet; secretary, W. A. Clemons, St. George, Ont..

CANADIAN AYRSHIRE BREEDERS' ASSOCIATION.

The Canadian Ayrshire Breeders' Association held their annual meeting in Montreal on February 12th and 13th. Resolutions were passed calling upon the Provincial and Dominion Governments to take all the necessary steps to bring about the eradication of tuberculosis in Canadian dairy herds; expressing the disapproval of daylight saving legislation; asking the government to rescind the order in council permitting the importation and sale of oleomargarine in Canada; approving of the organization of a National Live Stock Council and deferring the settlement of the question of financial support until a later meeting; approving the action of the Minister of Agriculture in sending the Live Stock Commissioner to England to facilitate trade in Canadian farm products. The following officers were elected:—President, A. S. Turner, Ryckman's Corners, Ont.; vice-president, Gilbert MacMillan, Huntingdon, Que.; secretary, W. F. Stephen, Huntingdon, Que.

CANADIAN THOROUGHBRED HORSE SOCIETY.

At the annual meeting of the Canadian Thoroughbred Horse Society a credit balance of \$2,600 was reported. This will be devoted to improving the breeding of Thoroughbred horses.

The following officers were elected: President, J. J. Dixon, Toronto; 1st vice-president, R. W. Davies, Toronto; secretary, T. J. Macabe, Toronto.

CLYDESDALE HORSE ASSOCIATION OF CANADA.

At the annual meeting of the Clydesdale Horse Association a resolution was passed authorizing the executive committee to take steps to procure a six-horse Clydesdale team to tour the large fair circuits in Western and Eastern Canada, and elsewhere if considered advisable.

The following officers were elected: President, Wm. Graham, Claremont, Ont.; vice-president, James A. Torrance, Markham, Ont.; secretary-treasurer, J. W. Wheaton, Toronto.

HACKNEY HORSE SOCIETY.

The annual meeting of the Hackney Horse Society decided to join both the Eastern and Western Live Stock Unions.

The following officers were elected: President, Robert Graham, Toronto; vice-president, W. E. Jewell, Bowmanville, Ont.; secretary-treasurer, H. M. Robinson, Toronto.

CANADIAN SHIRE HORSE ASSOCIATION

The Canadian Shire Horse Association appointed Mr. John Gardhouse, Weston, Ont., a representative of the Association to the Eastern and Western Canada Live Stock Unions.

The following officers were elected: President, J. Bovaird, Brampton, Ont.; vice-president, G. D. Morden, Oakville, Ont.; secretary-treasurer, G. de W. Green, Toronto.

CANADIAN PONY SOCIETY

At the annual meeting of the Canadian Pony Society the following officers were elected: President, Jno. M. Gardhouse, Weston, Ont.; vice-president, Dr. Fowler, Toronto, Ont.; secretary-treasurer, G. de W. Green, Toronto.

CANADIAN FARM PRODUCTS ASSOCIATION

Prince Edward Island has been designated the "Denmark of Canada" in so far as the co-operative marketing of eggs is concerned. The province has been organized into egg circles which cover a large part of the Island. Here, as in other parts of Canada, the organization has been carried out by the federal Live Stock Branch, which maintains three officers on the Island in charge of the work.

THE CANADIAN STANDARDBRED HORSE ASSOCIATION

At the annual meeting of the Canadian Standardbred Horse Association a resolution was adopted urging the removal of the ban against horse racing. A committee was appointed to confer with the Canadian National Exhibition Association with a view of having trials of speed at the exhibition resumed. The following officers were elected: President, Sam McBride, Toronto vice-president, F. S. Scott, Galt; secretary-treasurer, John W. Brant, Ottawa.

CANADIAN SWINE BREEDERS' ASSOCIATION

At the annual meeting of the Canadian Swine Breeders' Association authority was given the National Record Board to accept for registration the pedigrees of swine of any breed approved by the Board.

The following officers were elected: President, H. M. Vanderlip, Brantford; vice-president, M. W. Miller, Brome Centre, Que.; secretary, R. W. Wade, Toronto.

DOMINION SHEEP BREEDERS' ASSOCIATION

At the annual meeting of the Canadian Sheep Breeders' Association, the president announced that arrangements were almost completed for reciprocity in registrations between the American and Canadian Sheep Breeders' Associations.

The following officers were elected: President, W. A. Dryden, Brooklin, Ont.; vice-president, Jas. Bryson, Brysonville, Que.; secretary-treasurer, R. W. Wade, Toronto.

THE CANADIAN KENNEL CLUB

The annual meeting of the Canadian Kennel Club was held in Toronto on February 7th. Some slight modifications were made in the rules and regulations governing dog shows. The officers elected were President, Mr. Jos. Russell, Toronto; 1st vice-president, Mr. Harry Clayton, Toronto; 2nd vice-president, Mr. Fred W. Jacobi, Toronto; secretary-treasurer, Mr. Juan E. Dowling, Toronto.

Last year the Egg and Poultry Association not only marketed eggs but it disposed of 30,000 bushels of potatoes and handled the seed required in the province for the greater production work. The poultry work was extended to stock improvement by the inspection of flocks and the importation of breeding birds of high quality. Eighty-eight pure-bred flocks, comprising 4,500 hens were

inspected at the beginning of the season. Seventy of these were approved as breeding flocks. The number of pure-bred hens approved was 1,017 and of 140 males inspected 81 were approved. One thousand five hundred and eighty-three settings of eggs were distributed from approved flocks. In the summer inspection 190 flocks were culled. These included 10,646 hens, of which 4,425 were discarded. In the fall inspection, 46 out of 54 old males were approved and of 1,208 young males examined 228 were found to be good enough to be used for breeding purposes. Seventy-six male birds and 168 breeding females were imported and distributed amongst the members.

At the annual meeting of the Association held in Charlottetown in January, it was

announced that the Association is to be re-organized under a new charter with the name changed to that of Canadian Farm Products, with power to buy and sell, manufacture, import and export all classes of farm products and requirements. Fifteen branches have already been organized in the province. The organization has been brought to its present state of efficiency by Mr. Wm. Kerr of the Federal Live Stock Branch, who has tendered his resignation to the Department and will continue as manager of the concern. Last year the Association, through the egg circles, handled 843,004 dozens of eggs, and not only supplied eggs for the boys' and girls' school fair work of Prince Edward Island, but many hatchings were supplied for similar work in New Brunswick.

THE CENTRAL CANADA VETERINARY ASSOCIATION

The sixteenth annual meeting of the Central Canada Veterinary Association was held at Ottawa on January 16. Papers on various live-stock diseases were read and discussed. The following officers were

elected: Honorary President, Dr. F. Torrance, Veterinary Director General; president, Dr. George Hilton, Ottawa; vice-president, Dr. C. M. Higginson, Hawkesbury, Ont.; sec.-treas. Dr. A. B. Wickware, Ottawa

THE CANADIAN SOCIETY FOR THE PROTECTION OF BIRDS

During the year 1918 the Canadian Society for the Protection of Birds carried on a programme of educational meetings in the city of Toronto. On April 4th, Mr. Ernest Harold Baines, an eminent lecturer and organizer of bird clubs, was brought to Toronto to deliver a lecture at the convention of the Ontario Educational Association. His subject, "Wild Birds and How to Attract Them" was illustrated with lantern slides. In September a Bird Fête for children was held in the University of Toronto. A lecture with specimens was given by Mr. W. D. Hobson of Woodstock, Ontario. On November 19th, Mr. Hobson gave an address on "Bird Calls and Bird Ways" illustrated with lantern slides. The association invites the co-operation of officials and the public generally as follows:

County clerks are asked to co-operate in the protection of birds by reporting

to the Deputy Minister of Game and Fisheries, Parliament Buildings, Toronto, any failure on the part of county constables to enforce "The Protection of Birds Act."

Persons who have knowledge of any case of the destruction or capture of wild birds, or interference with their eggs or nests, are earnestly requested to communicate with the secretary of this Association.

The public are asked to limit the number of cats in order that birds may increase, to confine pet cats or keep them under observation during the nesting season, and to report to the local Humane Society the presence of stray and unowned cats. Many birds might be saved to destroy injurious insects and to delight us with their beauty and their song if family cats were belled.

The secretary of the Association is Miss Laura B. Durand, 153 University Avenue, Toronto.

EASTERN CANADA LIVE STOCK UNION

The annual meeting of the Eastern Canada Live Stock Union was held in Toronto on February 8th. A request was received from the Western Canada Live Stock Union that a committee be appointed to confer with that Union in drawing up a constitution for the National Live Stock

Council. This matter was referred to the directors for action.

The following officers were elected: President, Wm. Smith, M.P., Columbus; 1st vice-president, John Gardhouse, Weston, Ont.; 2nd vice-president, F. L. Fuller, Truro, N.S.; secretary, R. W. Wade, Toronto.

MARITIME SEED FAIR

A Maritime Seed Fair was held at Summerside, Prince Edward Island, on December 11, 12, and 13, 1918, at which exhibits of

seeds and potatoes were shown from the three maritime provinces. With a few minor changes the prize list was practically

the same as that of the last maritime seed fair, which was held at Amherst, Nova Scotia, in December, 1915. The largest number of entries came from Prince Edward Island, but Nova Scotia and New Brunswick were well represented and the prizes were divided amongst the three provinces.

The quality of the seed shown was good. Practically all the samples of grain were plump, uniform, pure and well selected. A few exhibits contained a small number of impurities, which could have been screened out quite easily by more careful preparation of the grain. In oats the leading variety was Banner. This variety has proven to be the most popular and best yielding variety for Eastern Canada. In wheat the quality was much above the average. The entries of barley were small in number but they were all of a high standard.

Potatoes were a fairly large class and were probably the best and most uniform exhibit

that has been shown at any seed fair in the east. They were shown under type instead of by variety, and were classified as, round white, oval white, long white, red skinned and dark-skinned.

The showing of root seeds was exceptionally good. Swede turnip, cabbage, mangel, beet and carrot seed were all exhibited, the showing of swede turnip seed being especially large. All the root seeds were well ripened and cleaned, and clearly demonstrated the suitability of maritime province conditions for root seed production.

Other small seeds, timothy, beans, flax, clover, etc., were of good quality, and all the sections, with the exception of clover seed, were well filled.

In connection with the fair a maritime farmers' conference was held, at which matters dealing with production, marketing and organization were discussed.

NOVA SCOTIA FRUIT GROWERS' ASSOCIATION

The annual meeting of the Nova Scotia Fruit Growers' Association was held at Bridgetown on January 21st to 23rd. A resolution was passed urging the need of a law making compulsory the grading of potatoes. Attention was drawn to the modification of the spraying of apple trees in the province. Lime sulphur spray has been wholly abandoned except as a third

spray where a modification of soluble sulphur is recommended instead on account of the 'russetting' which Bordeaux causes at this time.

The following officers were elected: President, Rev. H. S. Shaw, South Waterville; vice-president, V. B. Leonard, South Clarence; secretary, F. W. Foster, Kingston, N.S.

DAIRYMEN'S ASSOCIATION OF NOVA SCOTIA

The 6th annual convention of the Nova Scotia Dairymen's Association held at the College of Agriculture at Truro, on January 9th and 10th, was the most successful yet held by the Association. The principal resolution passed recommended a larger building and stronger co-operation among the three Maritime Provinces in reference to the Maritime Dairy School which has been in operation the last two years. Other resolutions were passed in reference to increased milk production as the most important branch of the dairy business.

A creamery butter exhibition was held in connection with the convention, at which were distributed \$670 in prizes.

The following officers were elected: President, Harold Falconer, Stellarton; vice-president, J. D. McKenzie, Bridgewater; directors, John C. Chisholm, Lower South River; W. L. Brenton, Brookfield; R. T. Stewart, Scotsburn; secretary-treasurer, W. A. MacKay, Truro; representatives to National Dairy Council, Harold Falconer, Stellarton, D. W. Murray, Scotsburn.

GRAND RIVER ALFALFA SEED CENTRE

BY ROSS MARTINDALE, SECRETARY, CALEDONIA, ONT.

The Grand River Alfalfa Seed Centre was organized at York, Ont., on July 21st, 1913, at a meeting of the seed growers of the district called by the Agricultural Representative for Haldimand country.

The soil of Haldimand county is a heavy clay loam, well adapted for growing alfalfa. It has been grown there for 50 or 60 years and there is every reason to believe that the first seed sown was of the variegated variety and this has been distributed throughout the county. Under these circumstances, this was considered an ideal place to organize the first alfalfa seed centre in Canada.

The main object of the centre which has twelve members, will be understood by By-Law No. 2; viz "To encourage the production of harder strains of alfalfa seed among its members and by means of co-operation to market the same to the best advantage." In order that we secure the hardiest strain a bushel of Grimm's seed was sown about July 1st, 1915. This seed was procured by Prof. C. A. Zavitz from Lymen of Minnesota and we are pleased to report that six acres of this seed has made a good start and we had 15 bushels of the seed last season.

In 1915 we sold 63 bushels and 33 pounds

of seed. This seed tested No. 1 with the exception of a few bushels which tested No. 2. The No. 2, however, was No. 1 in purity, but was marked down on account of general quality. The average price for this seed was \$20 per bushel. This season we have about 80 bushels of seed for sale. Our members are taking pains to clean their fields of weeds and are exercising greater care in harvesting, threshing and cleaning,

thereby turning out seed of a purer and better quality.

We believe prospects are bright for the success of seed centres throughout the Dominion. Through the help of the Canadian Seed Growers' Association and the Agricultural Representatives of the different counties, there is no reason why this should not be an ideal way for improved seed to be produced and distributed.

ONTARIO LIVE STOCK ASSOCIATIONS

The annual meetings of the Ontario Live Stock Associations were held in Toronto during the week commencing February 3rd.

ONTARIO CATTLE BREEDERS' ASSOCIATION

The Ontario Cattle Breeders' Association last year shipped co-operatively, in addition to 250 cattle, 67 horses, 180 sheep, and 4 swine.

The following directors were elected: shorthorns—H. Smith, Exeter; Hon. W. C. Sutherland, Galt; W. A. Dryden, Brooklyn; Geo. E. Day, Guelph; H. Pettit, Freeman; J. F. Mitchell, Burlington; Jno. Gardhouse, Weston; Holsteins—D. C. Flatt, Hamilton; R. A. Stevenson, Ancaster; R. F. Hicks, Newtonbrook; R. W. E. Burnaby, Jefferson; M. L. Hardy, Springford; Herefords—W. D. Smith, Hamilton; Angus—Jas. Bowman, Guelph; Galloway—Col. McCrea, Guelph; Jerseys—H. A. Dolson, Cheltenham; Ayrshires—John McKee, Norwich; W. W. Ballantyne, Stratford. President Jno. Gardhouse, Weston; vice-president, James Bowman, Guelph, secretary-treasurer, R. W. Wade, Toronto.

ONTARIO SHEEP BREEDERS' ASSOCIATION

The president of the Ontario Sheep Breeders' Association at the annual meeting recommended that the principles of the field crop competition be applied to sheep raising and that a score card be used in judging of general condition, type of sire used, quality of wool carried by the flock, and the production of lambs.

The following directors were appointed: Cotswold—Duff Brien, Ridgetown; Liecesters—Jas. Douglas, Caledonia; Lincoln—E. Robson, Denfield; Oxfords—J. Cousins, Harriston; Shropshires—W. H. Beattie, Wilton Grove; Dorsets—C. Stobbs, Leamington; Hampshires—Geo. Telfer, Paris; Suffolks—Jas. Bowman, Guelph; Southdowns—J. W. Springstead, Hamilton; General directors, H. Lee, Highgate; W. Whitelaw, Guelph. President, Geo. L. Telfer, Paris; vice-president, E. Robson, Denfield; secretary-treasurer, R. W. Wade, Toronto.

ONTARIO SWINE BREEDERS' ASSOCIATION

A resolution was passed by the Ontario Swine Breeders' Association instructing the incoming executive to endeavour to secure

through the Railway Commission the privilege of shipping pure bred swine at the half rate.

The following officers were elected: President Wm. Jones, Mt. Elgin; vice-president, Cecil Stubbs, Leamington, secretary, R. W. Wade, Toronto.

ONTARIO HEREFORD BREEDERS' ASSOCIATION

At the second annual meeting of the Ontario Hereford Breeders' Association a motion was passed increasing the annual membership fee from \$1 to \$2. It was decided to hold the next annual sale immediately after the Winter Fair at Guelph and to close entries for the sale two months previous to the date of the sale.

The following officers were elected: President, J. E. Harris, Kingsville; vice-president, John Hooper, St. Mary's; secretary-treasurer, Jas. Page, Wallacetown.

ONTARIO HORSE BREEDERS' ASSOCIATION

At the annual meeting of the Ontario Horse Breeders' Association Mr. C. M. McRae, head of the Horse Division of the Live Stock Branch, reported that 175 horse breeders' clubs are receiving the benefit of first class stallions. The following officers were elected:—President, Wm. Smith, M.P., Columbus; vice-president, John Boag, Queensville; secretary, R. W. Wade, Toronto.

THE ONTARIO YORKSHIRE CLUB

The Ontario Yorkshire Club elected the officers of the previous year as follows:—President, J. C. Stuart, Live Stock Branch, Department of Agriculture, Ottawa; vice-president, R. Garbutt, Belleville; secretary-treasurer, R. W. Wade, Toronto.

THE ONTARIO BERKSHIRE ASSOCIATION

The Ontario Berkshire Breeders' Association at the annual meeting expressed satisfaction with the progress that the breed is making which was shown by the number of pedigrees recorded. The following officers were elected:—President, H. A. Dolson, Cheltenham; vice-president, H. B. Jeffs, Bond Head; secretary, R. W. Wade, Toronto.

WOMEN'S INSTITUTE CONVENTION

The annual convention of the Women's Institutes was held in Toronto on February 4th, 5th and 6th. It had been planned to hold corresponding conventions in London for western Ontario and in Ottawa for the eastern part of the province but the influenza epidemic prevented all but the central meeting which was very largely attended.

The province now has 899 individual women's institutes and 20 girls' clubs or junior institute branches with a combined membership of over thirty thousand.

The character of the subjects discussed is indicated in the resolutions bearing on the following points:

Some adequate provision for the caring of insane and feeble-minded people;

The prohibition of the importation of poppy seed from Flanders;

Recommending the appointment of a Dominion board of censors for moving pictures with one or more women as members;

Urging branch institutes at their annual meetings to formulate recommendations or resolutions for the agenda of the general

provincial convention and the appointment of a member to open the discussion;

The addition of two women to the three men forming the public school trustee boards;

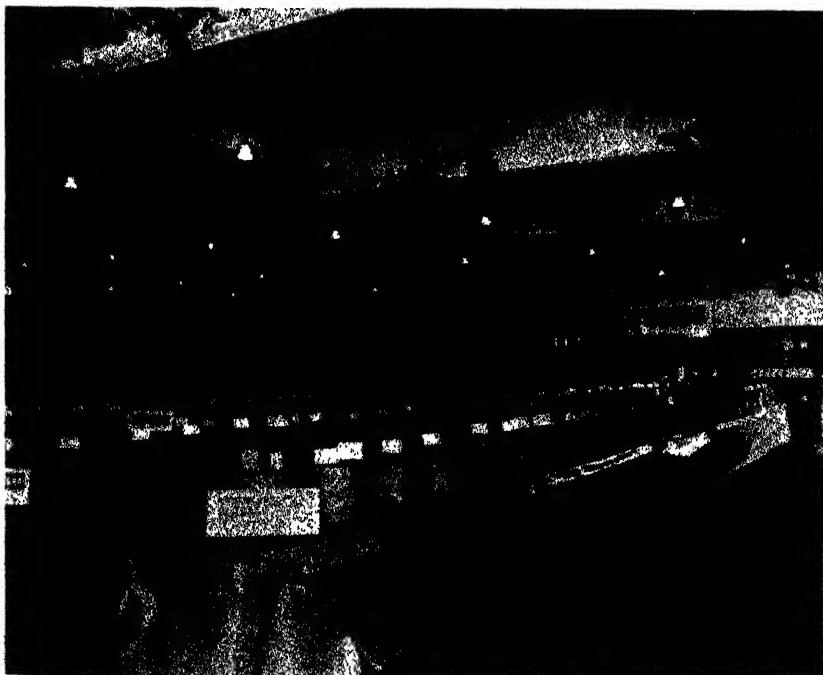
The placing of home nursing on the public, model and normal school curricula;

The appointment of delegates to the national federal meeting in Winnipeg.

A provincial-wide organization was adopted and a temporary plan was decided whereby a board of directors representing the seventeen districts should be elected at the annual convention or at special meetings held in each of the respective districts;

The seventeen directors were forthwith appointed and organized themselves with the following officers: President, Mrs. Wm. Todd, Orillia; vice-presidents, Mrs. Jas. Reid, Renfrew, Mrs. J. Patterson, Gadshill; secretary, Mrs. B. O. Allen, Port Arthur; executive committee, Mrs. M. E. Pearson, Merrickville, Dr. Annie Backus, Aylmer, Mrs. H. Beardmore, Port Credit, Miss Kate McKay, Brechin, Mrs. John Clark, Englehart.

WESTERN ONTARIO DAIRY EXHIBITION



DAIRY EXHIBITION, LONDON, 1919

An exhibition of cheese and butter held in connection with the Western Ontario Dairymen's Association annual convention at London on January 13th to 17th covered

a floor space of six thousand square feet. An important feature of the exhibition was an exhibit of modern dairy machinery.

ONTARIO PLOUGHMEN'S ASSOCIATION

The annual meeting of the Ontario Ploughmen's Association was held in Toronto on January 23rd. A committee was appointed to arrange for standard score cards to be used by the branches of the Ploughmen's Association and at the provincial ploughing

match. The following officers were elected: President, W. C. Barrie, Galt; first vice-president, A. E. Wilson, Perrytown; second vice-president, D. D. Gray, Experimental Farm, Ottawa; secretary and managing director, J. Lockie Wilson, Toronto;

CLOVER SEED GROWERS' ASSOCIATION

"The Kenora District Co-operative Clover Seed Growers Association Limited", Oxdrift, Ont., commonly known as the "Kenora Seed Growers", have been successful in their first year of co-operative marketing of clover seed. Seed to the amount of \$15,000 was handled by them during the winter of 1917-18. Proceeds from these sales after paying all operating expenses, interest, new equipment, yearly payment on property, etc., shows, a net profit of \$498.34, which is deposited in the bank to their credit.

These growers have done exceptionally

well at the leading winter fairs, as is shown in the following brief report:

Guelph, 1916....	6 out of 10 prizes offered
Ottawa, 1917....	13 " 15 "
Quebec, 1916....	2 Firsts
Guelph, 1916....	1st in Alfalfa
Guelph, 1917....	11 out of 14
Guelph, 1917....	Championship in Red Clover, and Keith trophy for best bushel clover seed. This was won for the second time.

Clover seed has made Kenora famous.

THE WESTERN CANADA LIVE STOCK UNION

The annual meeting of the Western Canada Live Stock Union was held at Brandon on January 16th to 18th. Dr. S. F. Tolmie, M.P. of Victoria, B.C. was elected president succeeding Dr. J. G. Rutherford. Vice-presidents were elected, for British Columbia, A. D. Patterson, Ladner; for Alberta, George Hoadley, M.P.P., Okotoks; for Saskatchewan, F. H. Auld; Deputy Minister of Agriculture, Regina; for Manitoba, Andrew Graham, Roland; Mr. E. L. Richardson was re-elected Secretary.

Resolutions voicing the sentiments of the meeting on a number of important matters were passed as follows:

Urging the Dominion Minister of Agriculture to urge the removal of the embargo against the admission of Canadian cattle into the United Kingdom;

That Canadian Breed Societies be admitted to membership in the Western Canada Live Stock Union and Eastern Canada Live Stock Union for a joint annual membership fee of twenty-five dollars;

That the Dominion Government's plan to assist the horse breeding industry be recommended to all governments wishing to aid this important branch of live stock.

That the Dominion Minister of Agriculture be requested to take such action through the Health of Animals and Live

Stock Branches of the Department as will cause the abolition of the charge of one-half of one per cent against stock of all kinds sold on certain public markets to meet the loss sustained through condemnations made in carrying out the provisions of the Meat and Canned Foods Act;

That the Dominion Department of Agriculture make special effort to secure for light horses in Western Canada, not needed for useful purposes, a market in European countries in which horse flesh is used as human food;

That such action be taken by the Dominion Department of Agriculture as will bring about a just system of grading live stock on the one hand and meats as sold in the butcher shops on the other, as will give justice to both producers and consumers and that the provincial department of agriculture provide instruction in the educational institutions for boys and girls in the proper method of selecting meats consumed in the home;

That negotiations between the Western Canada Live Stock Union on the one hand and the Eastern Canada Live Stock Union and the National Record Committee on the other, be continued with a view to arriving at an acceptable agreement in the formation of a National Live Stock Council.

INTER-PROVINCIAL COUNCIL OF FARM WOMEN

An inter-provincial council of farm women was organized at Brandon, Man., on January 8th. The purpose of this organization is to coordinate the work of the various provincial organizations and to have national machinery for the conduct of the vast amount of national business that is constantly before the organized farm women. It is representative of the United Farm Women of Ontario, the Women's Grain

Growers' Associations of Manitoba, and Saskatchewan and the United Farm Women of Alberta. This organization expects to be allowed to send its representatives to meetings of the Canadian Council of Agriculture.

The following officers were elected: President, Mrs. John MacNaughton, Harris, Sask.; vice-president, Mrs. Walter Parlbay, Calgary; secretary, Miss Mabel Finch, Winnipeg.

POULTRYMEN'S UNION OF BRITISH COLUMBIA

At a meeting of poultry breeders held in Vancouver last August the Poultrymen's Union of British Columbia was organized with Mr. J. R. Terry as Secretary with headquarters at Vancouver. The purposes of the Association are:—

To organize a co-operative association into which all poultrymen producing poultry and eggs in British Columbia may enter; to establish a system of furnishing poultry and eggs to consumers; to correct economic waste, and to furnish poultry supplies at cost to its members.

- (1) To act as the agent or representative of any member or group of members in marketing any or all of his poultry products.
- (2) To buy, rent, lease and acquire such real estate and personal property as may be necessary to carry on the business of the association and to sell, lease, mortgage, release, manage and control the same.

- (3) To borrow money and secure payment of the same by bond, mortgage, hypothecation or pledge, real or personal, upon any property belonging to the association, and to establish or buy stock or an interest in any established poultry business or lease one or more of the same.

- (4) To make and enter into contracts with its members or group of members or other persons deemed necessary by the board of directors to meet and discharge its obligations to promote the lawful purposes of its creation and to do any and all acts and things necessary to carry out the purposes for which this Association is formed which it may be authorized by law to do.

The amount of capital of the Association is one hundred thousand dollars, divided into one hundred thousand shares, of the par value of one dollar each.

BRITISH COLUMBIA POULTRY ASSOCIATION

The British Columbia Poultry Association held their annual meeting in Vancouver on January 9th. It was decided to continue the donation of monthly diplomas and silk ribbons to contestants in the 8th Egg-Laying Contest, and special prizes of \$5.00 each to members whose fowls exceed the limit in egg yield set for past contests. It

was decided also to award 1st, 2nd, and 3rd prize ribbons in the boys' and girls' poultry competitions organized by the Department of Agriculture. The following officers were elected: President, H. E. Waby, Enderby; vice-president, A. H. Anderson, Port Hammond; secretary, J. R. Terry, Department of Agriculture, Victoria.

THE BRITISH COLUMBIA DAIRYMEN'S ASSOCIATION

The fourteenth annual convention of the British Columbia Dairymen's Association was held on January 15th and 16th, 1919. Among the important resolutions passed were the following: Resolved that this Association go on record as being in favour of the system of buying milk and cream on a butter-fat basis rather than by the too prevalent system of buying by the gallon or hundredweight; Resolved that this Association emphatically endorse the resolution of the recent Dominion Dairy Conference in November, 1918, on the subject of making compulsory the furnishing of records of performance of sires and dams or progeny

of dairy sires sold; That this Association petition the provincial government to rigidly enforce the compulsory tuberculin test now in force in this province so far as it refers to or affects cattle used for dairy purposes and that 12 months be allowed for the enforcing of the said Act; and be it further resolved that this Association petition the government of British Columbia to at once establish compulsory dairy cattle insurance that will provide adequate indemnity for animals slaughtered and be maintained by equitable assessments from the provincial government as representing the public, and from the owners of the cattle; be

it further resolved that the importation of dairy stock shall be limited to animals purchased from accredited herds only.

The following officers were elected: Hon. President, A. C. Wells, Sardis; president.

J. W. Berry, Langley Prairie; vice-president, P. H. Moore, Essondale; secretary-treasurer, T. A. F. Wiancko, Department of Agriculture, Victoria.

A FURTHER STEP TO SECURE NATIONAL FLOWER

The question of selecting a national flower for Canada, that has been before the public for more than a year, was carried to a further stage by the Ontario Horticultural Association at the annual meeting held in Toronto in February, by the adoption of the following resolutions:

"That the secretary of the Ontario Horticultural Association notify all Horticultural Societies in the province that this Convention considers it desirable that each Society should take practical interest in the work of obtaining a national flower for Canada and a provincial flower for Ontario.

"That this Convention, being desirous of obtaining the support of the Dominion government to obtain a national flower for Canada, earnestly make request for that support through the Minister of Agriculture, and suggests that one phase of it should take the form of a small grant from the funds provided by the Agricultural Instruction Act; such grant to be used as directed by the Minister of Agriculture in consultation with the Ottawa Committee.

"That this Convention submits that, in connection with the adoption of a national or a provincial flower, it would be desirable for the federal and provincial Departments of Agriculture, through the Experimental Farms, Stations and Agricultural Colleges, to direct that at each such centre a collection of most of the principle native Canadian wild flowers be established for the purpose of enlightening Canadians and visitors from abroad on the riches of Canada's flora, and

for the secondary purpose of stimulating an interest in the making of better and more beautiful Canadian homes.

"That the Ottawa committee be instructed to take steps to ascertain to what extent the maple leaf is now officially recognized in national and provincial designs, or as an emblem. And that, should it be thought desirable to pursue the subject further, a suitable design of one distinct species, or a combination of several species, be made, and that collaborative work be undertaken to get such design officially adopted for Canada.

"That the Ottawa committee make a selection of at least one-half dozen flowers from which a national flower may be selected and that a circular be printed presenting those names and reasons for their selection, also that copies of said circular be sent to all Horticultural Societies for their consideration and discussion at public meetings in each district called for this purpose."

THE CORNUS CANADENSIS

The *Cornus Canadensis* is suggested by Mrs. J. E. White of Toronto as an appropriate floral emblem for Canada.

The group of tiny flowers within the white envelope of the involucre might represent the provinces within one government. It is beautiful from May to late autumn. It gives itself to design in conventionalizing, and for an emblem in printing has a clean, clear-cut appearance. It is very hardy and grows all over Canada.

CHILDREN'S PARKS AS PEACE MEMORIALS

A movement favouring the formation of "Children's Peace Parks" to be provided as War Memorial Parks in all of the principal cities and towns throughout Canada, was launched by the Ottawa Horticultural Society last month, and is now engaging the attention of other organizations, including the Playgrounds Association.

At the annual convention of the Horticultural Societies of the Province of Ontario, held in Toronto on February 5, 6 and 7, the delegates, by a unanimous resolution, went on record "as being in favour of the establishment of such parks and advised all horticultural societies throughout the Dominion to do all in their power to forward the movement."

The Dominion Land Surveyors have also endorsed the scheme by a resolution which

stated "their willingness to collaborate with other organizations in obtaining such parks." Other organizations and many individuals have expressed approval of the scheme.

The fundamental idea of the Children's Peace Park Movement is to provide "better cities for better citizens." Two basic facts are utilized; the first being that play is popular and a natural instinct on the part of the individual and the second that the child mind is plastic. Being plastic it provides the surest, quickest and best medium to bring about a better order of things in the world.

Canada has an abundance of land and vast undeveloped resources, but in proportion to her population, a small number of parks and playgrounds, and the Peace Parks, therefore, should prove valuable in many ways. In the larger cities, where the Play-

grounds Association is established, the movement would seek to provide a central or enlarged type of children's playground, with certain memorial features added. It seeks to establish them in such a way that they may become lasting memorials of the immense sacrifices made by those of this generation in order to bring about a better condition of affairs for those of future generations.

In the smaller towns the movement seeks to spread the good work of the Playground's Association, plus the added attractions of a

somewhat larger play park with a war memorial origin.

It is thought that in many places where no Playgrounds Association is in existence, the Horticultural Societies are the best civic organizations to take an active interest in the movement. The movement, however, is broad enough to receive support from all types of civic organizations, as well as many, individuals. In some of the smaller towns no doubt a wealthy citizen could be found who would donate such a park.

NEW PUBLICATIONS

DOMINION DEPARTMENT OF AGRICULTURE

EXPERIMENTAL FARMS

Poultry Feeds and Feeding, by George Robertson, Assistant Dominion Poultry Husbandman. Practically all varieties and classes of poultry feeds available in Canada are dealt with. Feed hoppers and other feeding equipment are illustrated and described.

CANADIAN SEED GROWERS' ASSOCIATION

The Annual Report.—The 14th annual report, which is for the year ending March 31, 1918, contains a statement regarding the constitution, objects and methods of the association; the officers and list of elected members, the minutes of the annual meeting and the papers contributed on that occasion.

PROVINCIAL DEPARTMENTS OF AGRICULTURE.

ONTARIO

The United Farmer.—The first number has appeared of the *United Farmer of Ontario*,

published in the interests of the organized farmers of Ontario and under the auspices of the Farmers' Publishing Company Ltd., Toronto. This number contains among other information a statement of the policy of the United Farmers of Ontario and a report of the convention of the organization recently held in Toronto.

MISCELLANEOUS

The Canada Food Board.

Fancy Meat in Newest Dishes is the title of a thirty-two page pamphlet consisting of recipes for the cooking of the cheaper portions of the carcasses of beef, pork and mutton.

Migratory Birds Convention Act.—A pamphlet has been prepared by Dr. C. Gordon Hewitt, Consulting Zoologist of the Department of Agriculture, containing the Migratory Birds Convention Act and the regulations thereunder, together with an account of the International Convention at which this was passed, and notes concerning its application.

NOTES

The Ottawa Vacant Lot Association in order to become self supporting has increased its membership fee to two dollars for a lot 25x100 feet. This fee will cover manuring, ploughing and disking.

A live stock shipping association known as the Rocklyn Club, in Grey County, has considerably more than three hundred members. During the year 1918 they shipped \$263,000 worth of live stock.

In the dairy profit competition conducted by the Agricultural Representative in Dundas County, Ontario, the heifer of the winning competitor gave 5,337 pounds of milk in seven months, with an average of 4.34 per cent of fat.

56037—6½

Miss Hazel Sterns, Supervisor of Women's Institutes in Prince Edward Island has accepted an important office in Montreal as household science teacher in the Chalmers Settlement. Miss Sterns is succeeded on the Island by Miss Della Saunders who has for some time been her assistant.

A competitor in the dairy profit competition carried on by Agricultural Representatives in Ontario, claims that he learned more about feeding dairy cattle during the past summer than he would otherwise have learned in ten years, on account of the close attention he gave to the relationship between feed given and milk produced.

The fifth group of soldiers from the Soldier Re-establishment Commission has

entered the Manitoba Agricultural College for a three months' course in agriculture. This work is preparatory to getting government aid in the purchase of land and equipment for farming. The number of returned men now taking this work totals over seventy-five.

During the carrying on of the short agricultural courses and home economic courses in Peel county, Ontario, the men and women were brought together in combined lectures each closing with a period of song singing. Social evenings were held with music and games. A strong community spirit was developed. The series closed with an excellent entertainment at which proficiency prizes were awarded.

A farmers' club organized by the Agricultural Representative in West McGillivray township, Middlesex County, in July, 1918, includes in its membership most of the farmers in the district. Besides buying a carload of flour and other supplies they have sold fifteen carloads of wheat, twenty of barley, and ten of oats. This club is referred to by the representative as typical of twenty-five farmers' clubs in Middlesex.

About 220 students took the short course in farm power at the Ontario Agricultural College this year. The course commenced on January 28th and concluded on February 8th. The farm power course which was conducted by Professor W. H. Day, included the construction and operation of many makes of tractors and engines and other machines used in agricultural operations.

The bee-keeping industry in Manitoba during the last two or three years has made enormous strides. The production of honey in 1918 aggregated in round figures, one million pounds, as against eight hundred thousand pounds in 1916 and about nine hundred thousand pounds in 1917. There are now 921 bee keepers in Manitoba, whereas in 1917 there were only 741 and in 1916 only 680.

The Regina Greater Food Production Association will this year charge its members a rental fee of two dollars for a lot twenty-five feet by one hundred feet. This includes membership in the association as well as ploughing and disc harrowing. The gardeners are given a lease of the property for one year provided they keep the land under cultivation free from weeds and they are given first choice of the same ground the subsequent year.

At the annual meeting of the United Farm Women of Alberta a resolution was passed requesting the Minister of Education of Alberta to call together the leading educators of the province interested in rural education, these to include the most successful rural school teachers, school inspectors, representatives of the agricultural, technical and normal schools, the Edmonton committees of the rural people's organizations and any others whom the Department might see fit to call, to consider the whole question of rural education.

The influenza epidemic took a severe toll from agricultural officials at Canadian institutions. From the Ontario Agricultural College two were taken, Mr. W. H. Scott, B.S.A., Director of Drainage Demonstrations and Mr. R. S. Vining, B.S.A., Lecturer in Animal Husbandry. Mr. Vining had recently been appointed after service overseas following a successful experience as an agricultural representative. The Ontario Department of Agriculture suffered a serious loss in the death of Mr. J. W. Stark, B.S.A., Agricultural Representative at Brampton whose work has been frequently before the readers of *The Agricultural Gazette*. Mrs. N. C. Macfarlane, Macdonald College Demonstrator of Homemakers' Clubs in the province of Quebec, was a victim of the epidemic on January 25.

The Departments of Agriculture and of Education of the province of British Columbia, at the conclusion of a joint census taken to ascertain the extent of food produced in city and suburban areas in 1918, reported a production valued at \$2,222,512. This included garden crops, poultry, rabbits, live stock, and honey. This is exclusive of large quantities of fruit, which was not included in the enumeration.

The Government of Saskatchewan has proclaimed that one week in each year shall be set apart as a special "Father and Son Week". It is proposed by means of meetings and banquets to be held during this week, to bring about a more hearty degree of co-operation in connection with boys' work, and to impress forcibly on fathers the great responsibility which rests upon them in regard to this work. The work will be under the special direction of the Young Men's Christian Association of Canada.

An Ontario Agricultural Representative at the end of an agricultural short course has made the observation that the short course is only a very small part of the farm boys' education. A number of the boys realize this and later decide to take a full course at the Ontario Agricultural College.

INDEX TO PERIODICAL LITERATURE

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PART V

The International Institute of Agriculture

FOREIGN AGRICULTURAL INTELLIGENCE

All communications in regard to this section should be addressed to T. K. Doherty, International Institute of Agriculture, Department of Agriculture, West Block, Ottawa.

SCIENCE AND PRACTICE OF AGRICULTURE

Mechanical Ploughing.—Handling of the Machines.

BY A. TARCHETTI

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At present the use of machinery for ploughing is spreading so rapidly, especially in France, Great Britain and Italy, that it will be necessary to modify the usual methods of cultivating the soil in such a way as to utilise the machines in the best possible manner.

This modification is all the more necessary in Italy since the greater number of the machines had to be hastily—and consequently not always so carefully—as was desirable—ordered from the United States, a country having different soil conditions and methods of cultivation, as well as of purchase and use of the machines.

Unfortunately, on the contrary, many farmers, obstinately clinging to the old customs, or slaves of routine, thought they could simply use the machine to replace the ordinary plough, thus obtaining an unsatisfactory yield of work, imperfect ploughing, and sometimes running the risk of having unpleasant surprises while the work was in progress.

However, it must be admitted that, though much progress has been made in the construction of machines for motorculture, and though there is an abundance of publications dealing with the subject, yet very little attention has been paid to practical instruction on their application to the soil, except for a few publications by experts dealing with special aspects of the vast problem ⁽¹⁾ and for pamphlets and catalogues—not always disinterested—published by the makers of such machines.

It is, therefore, not surprising that, owing to lack of more complete and detailed information, farmers are perplexed when about to buy new machines, or are embarrassed when using them on the farm.

The present notes are intended to provide new material for the study of this important question, by considering a series of data and practical rules concerning the new technique of cultivation.

A description will be first given of the handling of the machines in the field, followed by a more detailed consideration of the way they should be used in ploughing according to the various methods of preparing the soil.

Leaving aside balance machines (with cable or direct traction), the handling of which is reduced to engaging and lifting out the ploughs at the beginning and end of each furrow, only motor ploughs and tractors will be considered, as their handling is much more complicated, both during the work (ploughs in the soil) or when the ploughs are lifted.

HANDLING DURING WORK.—It is very easy to guide the machine during ploughing when the furrow is rectilinear, but it must be very straight. For this reason the first furrow should be turned most carefully with a team, for the perfection and easy working of all the following furrows depends on its straightness.

Handling becomes much more complicated when the furrow is curved. Let us take the example of a tractor with one driving wheel working in the furrow (Fig.1).

The coupling r , usually attached at about the middle a of the back-axle, can turn round this point, describing an arc of radius r (length of coupling). When the tractor turns, describing an arc of radius R , the chain and, consequently, the plough-beam should take up the position ac , in order that the width ploughed should remain constant. On the contrary, however, owing to the pull being on a curve the chain tends to assume the position ac^1 , normal to R^1 , so that there is a tendency for the ploughs to be displaced towards the centre O of the curve.

This tendency, whilst hindering the steering by causing a lateral component f to act on the driving wheels which causes the rear wheels of the tractor to be displaced transversely to the direction of movement, prevents the ploughing of a uniform width, as the ploughs tend to be displaced towards the ground already ploughed and to enter into the preceding furrows, while the displace-

⁽¹⁾ For example, see the articles by Prof. RINGELMANN in the *Journal d'Agriculture pratique*, 1916, p. 435 and 1917, p. 103.

ment is all the greater as the chain r is the longer and the turning radius R is shorter.

When the point where the chain (Fig. 2) is attached is moved to a' or as far as a'' , (as is done for hauling military lorries on the road), the difficulty is lessened, but not eliminated, for such a displacement should vary with the radius of the curve (1).

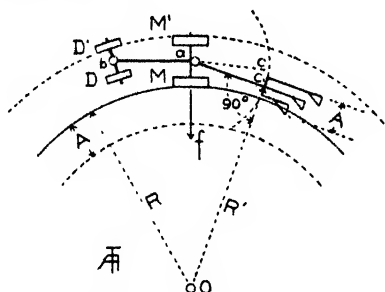


Fig. 1—Ploughing on a curve with a tractor with one driving wheel running in the furrow.

This difficulty is also not eliminated when ploughing on an *internal* curve, *i. e.*, when the driving wheel M' runs in the furrow. In this case the ploughs tend to move away from the ploughed land, thus covering a larger width and leaving strips unploughed.

This disadvantage is less noticeable with machines of the *MOLINE* type (front driving wheel) or with motor-ploughs of the *PAVESI-TOLOTTI* type.

With machines working, not in the furrow, but on the firm land, there is no difficulty in ploughing external curves, because their freedom of movement on the soil allows of the ploughs being guided into the correct position; on the other hand, the disadvantage is accentuated when working on an internal curve, the steering wheel D being obliged to run on the ploughed ground.

In any case ploughing curves is always very difficult, and results in a poor yield being obtained from the engine on account of the greater passive resistance, while the machine (even with a differential) wears more owing to the abnormal strain on gears and bearings. Work done on such curves can never be regular nor perfect.

It can be easily understood why circular ploughing is often practised in North America (the *FELLENBERG* method and its modifications) on account of the usually light soils and the fact that a depth greater than 5 to 6 in. is rarely ploughed. The regularity of the work in this case becomes merely a side-issue when compared with the benefit obtained by eliminating turning at the end of the furrows, the ploughing thus being continuous.

(1) Theoretically, the constance of the relative positions of the (rigid) coupling and the beam can be obtained for any turn by making them both of the same length, or by using a double (rigid) coupling crossed X-wise. In practice, however, this is not easy, on account of constructional difficulties and even of the ploughing, especially with gang-ploughs.

But, in Italy the more intensive cultivation, which requires better and deeper ploughing, the more compact soils, and the absence of vast plains, indicate the inadvisability of curvilinear ploughing, which should be reserved for indispensable work such as finishing off the corners of the field.

For example, let us assume that a corner

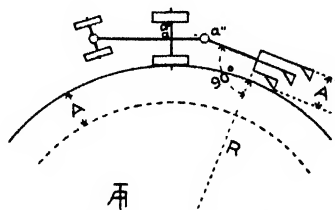


Fig. 2—Ploughing on a curve with a tractor with one driving wheel; effect of moving the coupling to a' .

of a field, forming an acute angle (Fig. 3) to take a simple case, has to be finished. It should be finished on a curve of the shortest radius compatible with the turning of the machine, *i. e.*, along the curve acb (shown as an arc to simplify matters) so as to reduce to a minimum the space $Oacb$ which has to be left to be finished by hand. But this is not possible because, whether working on internal or external curves there would be unploughed strips on the curves, given that the widths L of the first furrow are so much greater than the normal width l as the angle of the field is more acute.

The ploughing must, therefore, be done in *concentric* curves (Fig. 4); the part of the angle left untouched will, it is true, be greater, but the rest will be completely and uniformly ploughed.

The attention of the drivers should be drawn to this simple fact, especially when they wish to close the furrows by proceeding from the exterior to the interior of the field (as is done in rice fields where the golden rule is to heap the soil against the banks that surround the field, so as to strengthen them), in order that they may not open the first furrow with the maximum turn, then find that they cannot turn symmetrically on the curves of the subsequent furrows.

HANDLING WITH THE PLOUGHS LIFTED.—Handling with the ploughs lifted is much lighter and easier than during ploughing, but it is much more frequent, particularly when there are short furrows or irregular plots, so that they tire the driver the most. From this point of view, they thus deserve special consideration.

Turning is easier with two steering wheels mounted on a loose axle, turning like the front-wheels of an ordinary four-wheeled cart. It is less easy when the two wheels are turned as in the automobile type, and still less easy when there is only one steering

wheel. In the last two cases turning on the spot is very tiring if the tyres of the wheels are very prominent and it is almost impossible on very compact soils.

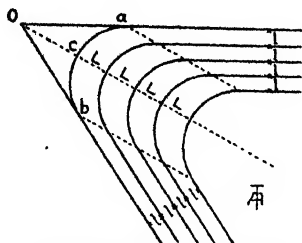


Fig. 3—Ploughing a corner of a field: bad method.

The turning should, therefore, be done while moving, and gradually, without pushing the turn to the maximum, for handling is nearly always more tiring on narrow curves; but, on the other hand, it should be done energetically and quickly so as to save time (thus obtaining more work and a smaller consumption of fuel) and space (smaller breadth of the headlands).

It is thus of interest to see how the machine can be handled in the field, while conciliating the opposite requirements of less fatigue with greater speed, in the narrowest space.

When it is said that a machine *turns* in a radius, of 5 meters for example, it means that the machine can, at the maximum, turn in a circle of 10 metres in diameter, but not that it could do the whole turn in a space of 10 metres except by doing the maximum turn *on the spot*, which never happens in practice.

For example, take a machine moving along a straight line AB (Fig. 5) and which, when at B , should turn to the right. The driver, letting the machine move forward, commences

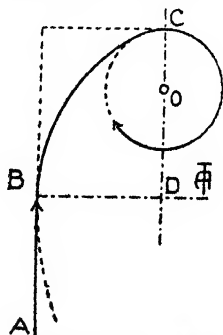


Fig. 5—Mathematical analysis of a turn.

to turn gradually towards C , the maximum turning point, after which the machine would advance automatically, describing an infinite number of circles of centre O and radius OC corresponding to the minimum possible to

the machine. The trajectory BC of the machine is evidently a polar curve, for, supposing that the turning could increase still more after the point C , the radius of

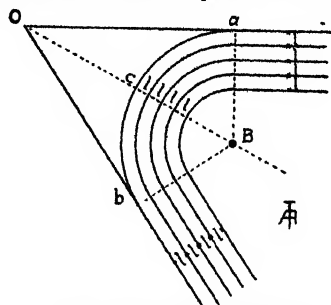


Fig. 4—Ploughing a corner of a field: good method.

curvature would be reduced to zero, *i.e.*, would attain the pole; the amplitude or development of the trajectory in the field depends, for the abscissae BD and the ordinates CD , on the ratio between the two speeds of advancing and turning (1) simultaneously.

If this ratio is constant, *i.e.*, if the machine moves forward uniformly and if it turns gradually, as in the cases when it would be obtained mechanically with a uniform movement, then the curve has a well defined equation: that of the logarithmic spiral, as is shown by the mathematical analysis.

Figures 6 to 16 represent by one of these spirals (the same in each figure, and on the same scale), a few of the commonest evolutions carried out in the field by tractor ploughs (usually with ploughs turning the earth on one side only), in order to compare the length covered (space covered as a function of time employed, and, consequently of fuel consumed) and the total amplitude of the turnings (sum of work or effort expended by the driver).

These figures show the form of the evolutions, carried out with constant speed in the minimum space, given:—(a) the maximum width of a headland, or the space in which the evolutions must take place included between the lines xx (end of the furrows) and yy (edge of the field) (Fig. 6); (b) as unit P of effort, making a complete turn (to pass from B to C , Fig. 5); (c) as unit S of space, the corresponding trajectory, that is, the length of the spiral BC .

Minimum turn with curve of 180°, or half-circle turn (Fig. 6).—When the last plough is about to reach the line xx at A (end of furrows) the steering wheels have reached B , where the turn to the right, for example, commences. Once the maximum turn has been reached at C , the driver begins to turn

(1) In Fig. 5, B is a point of the curve placed so that the tangents at B and C are normal to one another; this is an example of one of the commonest practical applications. But B could also be placed either above or below the line BD .

to the left until the machine reaches D , afterwards starting the return trip at A^1 . Total Journey = $2 S$; total work = $2 P$.

ters of the left-hand turn. Total journey = $2.8 S + DD^1$; total work = $2.8 P$.

Curve of 180° with minimum turn (Fig. 8).

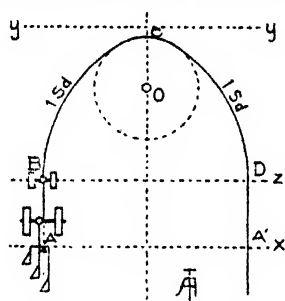


Fig. 6—Minimum turn at 180°

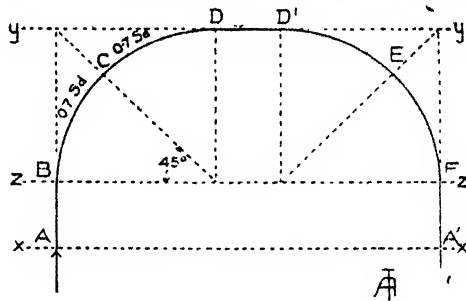


Fig. 7—Minimum turn at 90° repeated.

Minimum turn with curve of 90° (Fig. 7).—To reach half the turn (angle of 45°) at C the machine had to turn about one quarter to the right, travelling a distance of $0.7 \times S$; it has to turn the same distance to arrive at D . Total Journey = $1.4 S$; total work = $1.4 P$.

—From B to C , half-turn to right; from C to C^1 , arc of circle (without turning manoeuvre) of centre O , angle about 120° and length about $1.75 S$; from C^1 to E , half-turn to right to straighten out. Total journey = $2.75 S$; total work = $1 P$ (1).

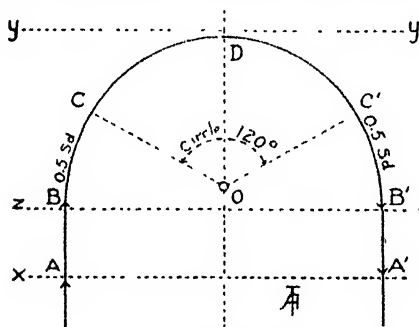


Fig. 8—Circle of 180° with minimum turn.

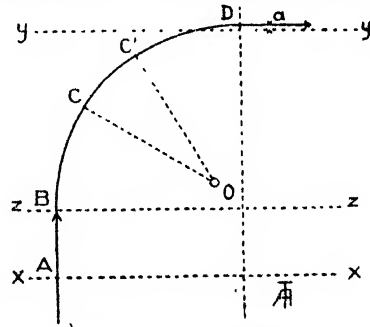


Fig. 9—Manoeuvre for decreasing the turning.

P . This turn usually serves to fix the breadth of the chief headland.

If it is desired to return to the furrows (turn of 180°) from D (or from D^1 , after a rectilinear journey along the edge of the field, the same manoeuvre must be repeated, i. e., that $D^1 E$ = about three quarters of the right-hand turn, and $E F$ = about three quar-

These results show that the turns should be kept within the limits of Figs. 6 and 8 (i. e., between 5 and 8 metres with the

(1) In the case of Fig. 7, the turning curve can be diminished as shown in Fig. 9, but a larger headland will be required (by the quantity a). In this case, for a curve of 90° or 180° , where are the values:—Total Journey = $1.5 S$, or $3S + DD^1$, total work = $1P$ or $2P$.

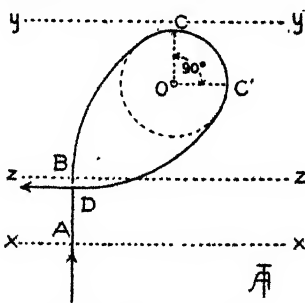


Fig. 10—Orthogonal turn.

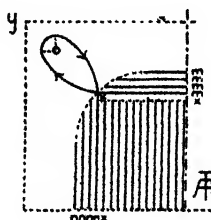


Fig. 11—Finishing work on a curve of two headlands with orthogonal turns.

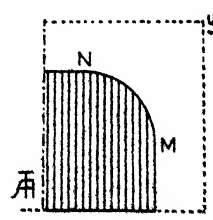


Fig. 12—Method of ploughing without headlands, eliminating orthogonal turns.

ordinary American machines) and that it is a mistake to think that very wide ridges (as in Fig. 7) save the driver trouble; he certainly has a period of rest (in the journey DD^1) but there is waste of both time and

advisable:—(1) either to eliminate these difficult orthogonal turns, by arranging that the first furrow should end in M (Fig. 12) from the beginning of normal ploughing and that the subsequent furrows should be

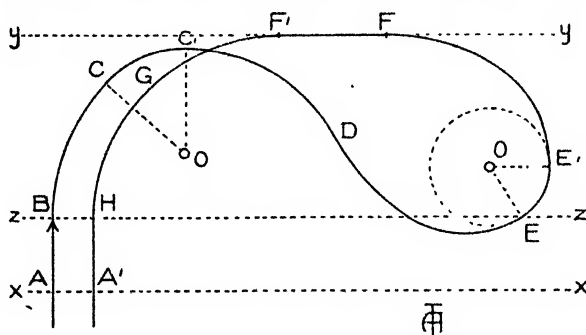


Fig. 13—Double turn within the breadth of an ordinary headland.

fuel, while the fatigue caused by each evolution is, on the contrary, greater than that resulting from narrower, or at least equal turns. Moreover, the repeated passage of the wheels over the length DD^1 damages the soil so much that there is very poor grip when turning the last furrows on the edge of the field.

Orthogonal Turn or at 270° (Fig. 10).—From B to C , complete turn to the right; from C to C' , without a manoeuvre, a quarter circle with the smallest turning radius OC ; from C' to D , complete turn to the left. *Total journey* = $2.5 S$; *total work* = $2 P$.

gradually prolonged until they describe the curve $M N$ suitable for turning the machine; (2) or to replace the orthogonal turns by figure-of-8 turns (described later) limited to the chief headlands when they must be reduced to the same breadth as the side headlands.

Double or figure-of-8 turns (Fig. 13, 14, 15, 16).—These are necessary (if the machine has no reverse, or if, having one, the coupling to the ploughs is not rigid) when the machine has to turn in a space narrower than $B D$ of Fig. 6 (i. e., usually less than 6 metres), as when the first furrow is being opened or the ploughing finished.

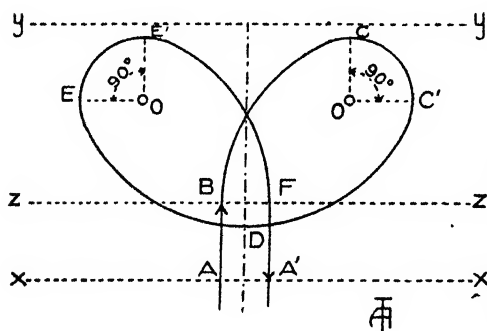


Fig. 14—Another example of a double turn within the headland, symmetrical to the axis of the furrows.

Figures 13 and 14 give examples of two double turns in the limits of breadth of the ordinary headland. That of Fig. 13 is longer and more difficult, as it requires: *Total journey* = about $6.15 S$ and *total work* = $4.5 P$, while the turn in Fig. 14 requires: *Total journey* = $5 S$ and *total work* = $4 P$, and it is easier to carry out, being symmetrical to the axis of the furrows.

Figures 15 and 16 show two double turns inside the field, with no headland, as in ploughing without ridges or by the Fellenberg method. The turn of Fig. 15 is symmetrical to the axis of the furrows but is much longer than that of Fig. 16. The respective values are:—*Total journey* = $6.75 S$ and $3.8 S$; *total work* $3 P$.

This manoeuvre, useful for hauling mowers or harvesters, is recommended by several authors for ploughing also, for preparing the finishing curves at the headland (Fig. 4), turning the head furrows $m, m, m...$ and the side furrows $n, n, n...$ which permits of shortening the furrows by diminishing the work on the curve (Fig. 11). But it is

The various evolutions illustrated by these figures illustrate special problems, for in practice, freedom in turning allows the driver to enlarge or diminish the curve of the turns at will by decreasing or increasing the turning speed, but the relation of the journey and especially of the total work remains practically the same.

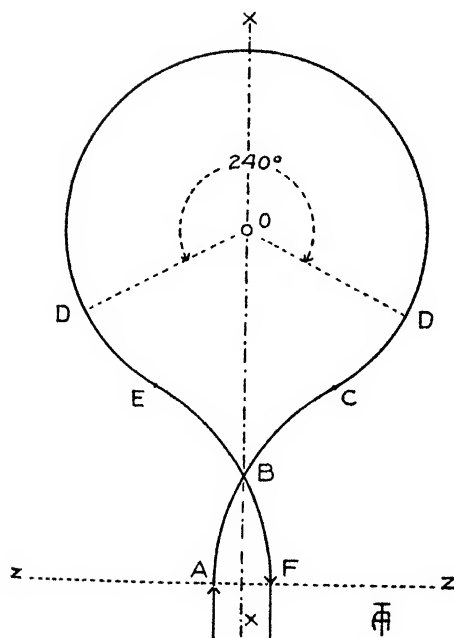


Fig. 15—Double turn inside the field, symmetrical to the axis of the furrows.

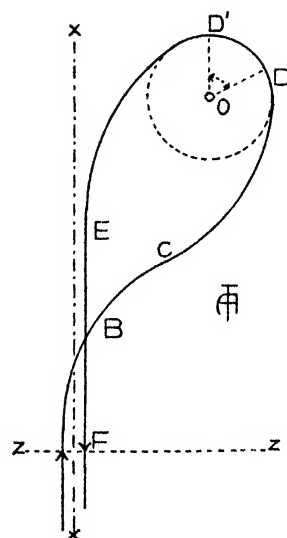


Fig. 16—Double turn inside the field, not symmetrical to the axis of the furrows and shorter than that of Fig. 15

This is why, when buying a ploughing machine it is very important to study and observe its behaviour in the field, by means of repeated turning trials on the field with the ploughs lifted, not only with the object of exercising the driver and making the turns more exact and sure, but also on account of the need of arranging the division of the field and even the choice of the methods of ploughing so as to suit the type of machine.

(To be continued.)

GENERAL INFORMATION

1070—On the Bactericidal Action of Sunlight (Total White Light and Partial or Coloured Lights).—DE LAROCQUETTE, M., in *Annales de l'Institut Pasteur*, pp. 170-192. Paris, April, 1918.

The action of sunlight on bacteria has been considered above all as a destructive action in which chemical rays, especially ultra-violet rays, play an almost exclusive part. Numerous facts, however, especially in warm countries, where bacteria are not lacking in spite of the amount of sun, seem to show that the bactericidal action of sunlight is neither as efficient nor as constant as is generally believed, and that special conditions are required for its action.

The author sought to solve experimentally the following questions:—(1) To what extent has sunlight a bactericidal action in the air, in liquids and solids? (2) To what depth does its action penetrate under these conditions? (3) What intensity and duration of

insolation does this action demand? (4) How does it act? (5) Is the action chemical, calorific, or desiccative? (6) What are the differences in this respect between the various rays of the solar spectrum?

The experiments were made at Algiers in two principal series:—from May to July, 1914, and from November to December, 1916. In the first, made in summer, the bacteria were acted on with the maximum intensity of sunlight. In the second, made in autumn, moderate intensities could be used similar to those in the north of France. In some of them white or coloured (blue, green, yellow, red) greenhouses built north-south were used. In these, plants, bacteria, moulds, and various animal species were grown continually, from 1911 to 1914.

The results obtained from the various experiments are described in detail. In discussing the effect of insolation on *Bacterium coli* in water at various depths heat is shown to play an important part in the bactericidal action of sunlight which appears, partly, to act by evaporation. Filtration of light through glass of any colour greatly reduces its evaporation power and, at the same time, its bactericidal action. The writer's conclusions are:—

Sunlight is only bactericidal with prolonged or direct insolation; it reacts particularly on the surface of dry media and in air where bacteria are more exposed to sun rays and desiccation. In liquid media the bacteria are only destroyed when the light is very intense and at shallow depths. Total white light is

much more active than any partially coloured light. Diffused light is insufficient. Blue light is slightly more bactericidal than other coloured lights, but much less so than white light; yellow comes next, then red and lastly green, which, for bacteria as for plants, is most closely related to black.

The most active part of the solar spectrum is the luminous part; ultra-violet has a slight action in the bactericidal effect of sunlight; filtration through a thick glass which absorbs most of the solar ultra-violet did not perceptibly diminish these effects. The same applies to infra-red; filtration of sunlight through water did not inhibit its bactericidal action. Nevertheless heat plays a certain part; cooling with ice during insolation delayed the death of the bacteria and the desiccation of the medium.

The bactericidal power of the rays appears to be connected both with their chemical action and their dehydrating action (on the protoplasm and culture medium) and, the author believes, more particularly to the latter, which, however, is not exclusive, since it cannot act efficiently in liquid or strongly hydrated media. In this case it would be due to a kind of kinetic shock or poisoning by excessive energy.

Finally the death of bacteria exposed to the sun seems to be caused by too great an absorption of energy, of which the first effect is usually dehydration and coagulation of the protoplasm. As it is only the energy absorbed which acts, the so-called chemical rays with the shortest waves are most active on the surface, probably because they are most largely absorbed by the bacteria and media. At a depth, however, the more penetrating calorific rays are more efficient, but can produce no bactericidal effects because of their progressive filtration and slight density. Moreover, all rays, like all forms of energy, are destructive or beneficial for living protoplasm, and consequently for bacteria, according to the quantity absorbed, and there is no specific action properly speaking. In the bactericidal effect exposure to the air which usually accompanies exposure to the sun must also be taken into consideration as it contributes very largely to the desiccation of the bacteria and media.

In practice, both in hygiene and therapeutics, it would be useless to rely largely on the bactericidal action of sunlight, especially in temperate districts, as it has no effect at a depth exceeding a few millimetres and is inhibited by thin layers of fat or muscle.

1071—*Researches, from the Standpoint of Food Hygiene, on the Ganglionic and Muscular Virulence of Macroscopically Healthy Organs in Generalised Bovine and Swine Tuberculosis.*—CHAUSSE, P., in the *Annales de l'Institut Pasteur*, Year XXXI, No. 1, pp. 1-18. Paris, 1917.

1076—*Australian Interstate Conference of Agricultural Scientists.*—In *The Journal*

of the Department of Agriculture of South Australia, Vol. XXI, No. 5, pp. 388-390. Adelaide, 1917.

A Conference attended by agricultural scientists from all the Australian States convened by the Federal Government at the instance of the Advisory Council of Science and Industry, was held in Melbourne from November 9 to November 16, 1917. A number of papers dealing with different aspects of agricultural science were read and discussed. The following resolutions were carried by the Conference and forwarded to the Executive Committee of the Advisory Council of Science and Industry of the Commonwealth of Australia.

That a "Seed Improvement Committee" be formed, that a Plant Introduction Bureau be established, that rust in cereals be made the subject of a special investigation, that a meeting of plant breeders from the different States be held annually with a view to co-ordinating their work, that an organization should be established to deal with the most promising indigenous grasses and fodder plants, that a thorough investigation be made into the possibilities of fibre cultivation in Australia, that special experiments be arranged to determine the actual yields of power alcohol obtainable from certain crops, and that there be appointed a permanent agricultural representative from Australia to the United States, whose duties should include keeping Australia in touch with improved scientific and practical methods in agriculture.

CROPS AND CULTIVATION.

1077—*Investigations into the General Movements of the Atmosphere.*—GARRIGOU-LAGRANGE, P., in *Comptes rendus de l'Académie des Sciences*, Vol. CLXVII, No. 4, pp. 170-172. Paris, 1918.

1078—*The Effect of Weather on the Yields of Potatoes, Wheat and Maize, in Ohio, U.S.A.*—WARREN SMITH, J., in the *Monthly Weather Review*, pp. 78-87, pp. 222-236, pp. 74-75. Washington, February, 1914; May, 1915; February, 1916.

1079—*The Reserves of Soil Water During Drought.*—DUMONT, J., in *Comptes rendus de l'Académie des Sciences*, Vol. CLXVII, No. 7, pp. 278-280. Paris, 1918.

1081—*Evaporation from the Surfaces of Water and River-Bed Materials.*—SLEIGHT, R. B., in the *Journal of Agricultural Research*, pp. 209-261. Bibliography of 27 Publications. Washington, July 30, 1917.

1082—*Irrigation of Alfalfa in Imperial Valley, California.*—PACKARD, W. C., in the *University of California Publications; College of Agriculture, Agricultural Experiment Station Bulletin* No. 284, pp. 67-84. Berkeley, California, September, 1917.

1084—**Dry Farm Crop Rotations and Cultural Methods, in U. S. A.**—ATKINSON, A., STEPHENS, J. M., and MORGAN, G. W., in the *University of Montana Agricultural Experiment Station, Bulletin* No. 116, p. 54. Bozeman, Montana, March, 1917.

This bulletin gives the results of experiments on crop-rotations suitable to dry farming carried out by the Montana Experiment Station in co-operation with the Bureau of Plant Industry of the United States Department of Agriculture. The experiments were made at the Judith Basin Sub-station and the Huntley Experiment Farm.

The average annual rainfall at Judith Basin during the last 18 years was 16.66 in., 10.90 of which fell between April and September 30. The average annual rainfall at Huntley was 13.74 in., 8.42 of which fell between April 1 and September 30. At both stations the heaviest average rainfall occurs in May and June. The total evaporation from April to August inclusively amounted to an average of 25.049 in. at Judith Basin during the last eight years and 20.397 in. at Huntley during the last four years.

The average temperature from April to September inclusively is 54.8° F. at Judith Basin and 59.7° F. at Huntley. The greatest deviation from the ordinary monthly average occurs in June at both stations.

The experiments were conducted on the same basis at the two stations, the normal principal crops being cultivated in various rotations, by different methods of seed-bed preparation and systems of continuous cropping.

The cultivation of the plots, which were 1/10 of an acre in area, is dealt with in detail. The results of the experiments are given in detail with many tables; they may be summarized as follows:—

In the 2-year rotation, containing grains and maize or spring grains and fallow, the highest profit was obtained with the system containing maize.

In the 3-year rotation, containing spring grain and either maize or fallow the third year, maize proved more profitable than fallow.

In the 3-year rotation of two cereal crops and one of maize it was found more profitable to disc the maize land than to plough it as a preparation for one of the small grain crops. In rotations containing green manure rye was found more satisfactory than peas for this purpose. The 3-year rotation containing green manure was less profitable than the 4-year rotation containing green manure. Three and four year rotations, including green manure, gave less satisfactory results than similar rotations in which clean fallow replaced green manure.

Rotations containing sod crops for two or three years gave comparatively low profits. Brome proved slightly more profitable than alfalfa.

In the continuous cropping experiments with winter wheat, autumn ploughing proved

most profitable at Judith Basin and summer following the least profitable. At Huntley the best results for winter wheat were obtained with summer following, the worst with subsoiling.

In the spring wheat and oat series listing gave the most satisfactory results and summer following the least satisfactory ones at Judith Basin; listing was also the most satisfactory method at Huntley.

At Judith Basin maize was most profitable on spring ploughing and least profitable on summer fallow. At Huntley maize did best on spring listing and worst on summer fallow. For flax spring ploughing was the most profitable and summer fallow the least so at Judith Basin, autumn ploughing the most profitable and subsoiling the least profitable at Huntley.

1085—**Experiments on the Electro-culture of Growing Crops, in Scotland (1).**—HENDRICK, in *The Scottish Journal of Agriculture*, pp. 160-171. Edinburgh, April, 1918.

The experiments described were begun over nine years ago by Mr. Low, of Balmakewan, on his farm of Mains of Luther, Kincardineshire. He tested on a field scale the effect of a high tension overhead electric discharge distributed on the system of the Agricultural Electrical Discharge Co., Ltd., upon ordinary farm crops. After experiments had been carried out on a large scale for some years upon a number of fields under the ordinary rotation of the farm without any distinct result being obtained, Mr. Low, in order to avoid some of the difficulties and sources of uncertainty encountered in the experimental method previously followed, drew up, in consultation with the author, a plan for a series of plots upon a selected piece of ground of an area of about six acres, situated in one of the fields of the farm.

The article, after giving details of the apparatus, gives the following conclusions:—

In the experiments at Mains of Luther, the application of a high tension electric discharge on the Lodge Newman system to growing crops has been thoroughly tested over a period of five years and no consistent improvement in any of the crops grown—oats, barley, hay, potatoes, turnips and swedes—was obtained. There seems no reason to suppose that electric current applied in this way to growing crops will give results that repay the cost and trouble incurred. Much more scientific work requires to be done to determine the effect of electric discharges on growing plants before we can apply such treatment economically to farm and garden crops or even decide what kind of apparatus should be used.

Great care is needed in reporting the results of electrocultural experiments so as not to create premature hopes of immediate practical results which, when they are not confirmed, cause disappointment and lead practical men

(1) See *Agricultural Gazette*, July, 1918, page 734, No. 10.

to conclude that science merely leads to useless and wasteful expenditure.

1086—New Plants and Seeds Introduced into the United States during the Period from January 1 to March 31, 1916.—U. S. Department of Agriculture, Bureau of Plant Industry, Inventory, No. 42 (Nos. 39,682 to 40,388) of Seeds and Plants Imported by the Office of Foreign Seed and Plant Introduction During the Period from January 1 to March 31, 1915, 123 pp. +9 Plates. Washington, 1918.

Mr. F. N. Meyer undertook a botanical expedition into the province of Kansu, China, and brought back a large number of interesting plants, descriptions of some of which are given in the article in the Institute Bulletin.

1087—Plant Ecology and its Relation to Agriculture.—WATERMAN, W. G., in *Science*, New Series, Vol. XLVI, No. 1184, pp. 223-228. Lancaster, Pa., September 7, 1917.

The author defines ecology as the *science of organisms as affected by the factors of their environment*; it is connected with both morphology and physiology, but more closely with the latter. Up to the present the methods of ecology have been largely descriptive, but now they are becoming increasingly quantitative, employing, in many cases, elaborate and delicate instruments. The experiments are made in the field and in the laboratory under both controlled and natural experimental conditions. The chief aim of ecology and the object of its observations and determinations are to determine the various phenomena observed and to draw from the data obtained the general principles underlying the reaction of plants to their environmental factors.

The article gives summary accounts of general and special ecology, of ecological agricultural processes, and of contributions of ecology to agriculture.

Finally the author recommends the introduction into agricultural studies of a course of ecology as a complement to morphology and plant physiology and an introduction to practical agriculture. Whereas the methods followed in practical agriculture, as well as those in agricultural research, are still theoretical, those used in ecology are scientific, although the study material is much the same as that of agriculture, to which ecology would be most largely applied. It is, nevertheless, obvious that ecology belongs to botany as well as to agriculture, and, instead of being a cause of controversy between the two it should be a means of co-operation between both to maintain a high standard in research and generalization into the conditions under which plants respond to environmental factors.

1088—Crop Centres of the United States from an Ecological Point of View.—WALLER, A. E., in the *Journal of the American Society of Agronomy*, Biblio-

graphy of 25 Publications. Lancaster, Pa., February, 1918.

The geographical distribution of the principal cultivated crops of the United States appears to coincide with the well-known centres of wild vegetation, that is to say, with the districts where the combined action of the climatic and "edaphic" (1) factors form a centre favourable to the development of the species which constitute the local type of vegetation. By comparing the climatic data (chief among which are precipitation and evaporation) and "edaphic" data (dealing with the physical and chemical properties of the soil considered as factors in the distribution of the species) with the distribution of the principal crops of the United States (from information given in a study published by the Department of Agriculture (2) the author confirms the concurrence of the various crop centres of the United States with the centres of wild vegetation.

The maize and winter wheat belts correspond to the central deciduous forest and the prairie centres, the artificial pasture belts to the north-eastern evergreen forest, the cotton belt to the south-eastern evergreen forest, the natural pasture or savana belts to the undulating semi-arid districts, unless dry-farming or irrigation have to be reckoned with.

The ratio (precipitation—temperature of the evaporating surface x wind velocity x relative humidity), that is to say, the ratio between precipitation and evaporation, is a useful criterion for marking the limits of the different centres because it is based on factors which greatly influence plant growth. Edaphic factors also frequently determine the distribution of cultivated plants, and, though they may be independent of climatic factors in their effects, often determine the use of the same agricultural methods. The distribution of spring cereals (wheat and oats) is chiefly influenced by edaphic factors. On the other hand economic factors modify the influence of climate and soil, as is especially the case with the potato, the cultivation of which depends largely on soil conditions.

When cultivated crops are grown outside their usual centre their behaviour differs largely from that of the wild plants. The crops are found in the best soils, as only in this case can they compete with the other plants. Many invading plants can, however, only compete with the wild growth in the worst soils; in the better ones the plants of the district have little to fear from invaders. Exotic crops not only demand the best soils but also certain modifications of the soil and,

(1) By "edaphism" is meant the totality of trophic and geographical relations, that is of nutrition and surroundings, between the plants and the soil, consequently the fundamental problem of edaphism is the study of the liquids of the soil and of the physical, chemical and climatic factors which may modify their properties.

(2) SMITH, M., BAKER, O. E., and HATYORTH, R. G., A Graphic Summary of American Agriculture. Year-book of the U. S. Dept. of Agriculture, 1915, pp. 323-433 + 4 Diagrams + 38 Maps. Washington, 1916.

in extreme cases, climatic modifications, *i.e.*, they must be grown under glass or shelter.

Domestic animals are also distributed according to the production centres of the crops upon which they are most dependent. Thus, the dairy industry is concentrated in the artificial pasture belt, the breeding of beef cattle and swine is centred in the maize belt, horse breeding in the oat belt, mules are largely found in the cotton belt and sheep in the arid districts.

To sum up, the methods of studying the succession of wild plants can be applied to cultivated crops so long as the conditions produced by the past and present physical factors are definitely determined. The migration of plants, which may lead to their invading another district and competing with and dominating the native plants, is the direct result of the combined action of climate and soil on vegetation. In this connection too much stress cannot be laid on the value of the methods of thorough research used by ecologists in determining the habitat of plants, methods which include the use of instruments for the exact determination of the moisture, temperature and evaporation, as well as the recording of plant growth in relation to its surroundings by means of photographs.

1092—**Stachydrin, a New Nitrogenous Compound Isolated from Alfalfa Hay in the United States.**—STEENROCK, H., in the *Journal of Biological Chemistry*, pp. 1-13. Baltimore, July, 1918.

1095—**Relation Between Pigmentation and Oxidation Phenomena in Plants; a Study of the Comparative Respiration of Red Leaves and Green Leaves.**—NICOLAS, G., in *Comptes rendus des Seances de l'Académie des Sciences*, Vol. CLXVII, No. 3, pp. 130-133. Paris, 1918.

1097—**Antagonism Between Growth and Reproduction in Plants; Factors Influencing these Two Processes.**—BLACKMAN, V. H., in *Science Progress*, pp. 49-53. London, July, 1918.

1098—**The Heredity of Early and Late Ripening in an Oat Cross, in England.**—ST. CLAIR CAPORN, A., in the *Journal of Genetics*, pp. 247-257. Cambridge, August, 1918.

The results are given of experiments in the inheritance of earliness by crossing the early oat, Mesdag (ripe on July 26 in 1913) and the late oat, Hopetown (ripe on August 13 in 1913).

1102—**Variations in Seed Tests Resulting from Errors in Sampling.**—STEVENS, O. A., in the *Journal of the American Society of Agronomy*, pp. 1-19. Lancaster, Pa., January, 1918.

Variations in the results of seed testing are largely unavoidable. They may be

divided into two groups, one purely mathematical, the other personal or, to a large extent, economic (due to lack of money to buy the best apparatus and to employ efficient and trained workers). The direct mathematical causes are:—

For germination tests:—imperfect mixing, random sampling, errors in counting, effect of personal selection (there is a tendency to pick out the better seeds), unsuitable conditions for germination, special condition of the seed.

For purity tests:—imperfect mixing, random sampling, errors in weighing, effect of personal selection, errors of identification.

During the years 1914 and 1915 the author investigated in the Department of Botany of the North Dakota Agricultural College the errors due to mathematical causes. Both in the germination and purity tests the general plan was for one person to take simultaneously a series of 50 tests from one lot of seed and to calculate the standard deviation and probable error.

Details of the experiments are given in the article in the Institute Bulletin under the heads "germination tests", "variation in purity tests." The article concludes as follows:—

The probable error of a single germination test of 100 to 400 seeds for percentages of germination of 99, 97, 95, 90, 80 to 50 respectively varies as follows: 0.75, 1.00, 1.50, 2.25, 2.80 in samples of 100 seeds; 0.50, 0.70, 1.00, 1.50, 2.00 for 200 seeds; 0.40, 0.55, 0.80, 1.20, 1.75, for 300 seeds; 0.35, 0.50, 0.70, 1.05, 1.50 for 400 seeds. The figures increase by about $\frac{1}{5}$ in the lower percentages of germination for Leguminosæ containing so-called "hard" seeds. This is for work in which the causes of variation are reduced to a minimum. No attempt was made in this study to determine the range of value when factors other than those of mathematical probability enter to any extent. These values may be used for other experiments involving similar conditions, *e.g.* in counting 500 seeds to determine the percentage of mixture of two kinds.

II.—In samples which do not contain mixtures of materials with a tendency to separate readily (such as sand, fine impurities, or coarse material) only a small amount of mixing seems necessary. Such samples should receive a supplementary test of larger quantity to show the approximate amount of such materials. For example, these may be first separated by a sieve, and the percentage added to that obtained by a regular test from the remaining quantity.

III.—The accuracy of purity tests depends on many factors. The quantities used should be carefully investigated to determine whether those in current use may be advantageously changed. The second decimal figure is of no value in most cases. If such accuracy is required the determination must be made with a sufficiently large sample (*e.g.* for about 8 oz. of wheat 30 gm. should be

taken for flax and small seeds, three times the usual quantity).

IV.—Results of seed tests should be accompanied by an indication of their accuracy i.e., by the value of the probable error. In practical tests this should be doubled because there are about four chances in five that the correct result lies within the figure thus corrected.

V.—The second decimal figure is not necessary for the calculation of the probable error in such tests.

VI.—The amount of seed used for such tests (and therefore the degree of accuracy obtained) should be regulated by two factors—the degree of accuracy required for dependable results, and the amount of work it is possible to handle. In germination tests it is advisable to use 200 seeds per test, the number being increased if desired. It is most important to know the probable error so that such adjustments may be made.

VII.—Duplicate tests appear to be of little value; one test of 200 seeds will often require less space and time than two of 100 seeds.

The author compares his results with those of RODEWALD (*Über die Fehler der Keimprüfungen, Landwirtschaftliche Versuchsstationen*, Vol. XXXVI, pp. 105-112, 215-227; 1899), with which, on the whole, they agree well.

1103—Date and Rate-of-Seeding Tests with Spring Grains under Irrigation.—ATKINSON, A., in the *University of Montana, Agricultural Experiment Station Bulletin* No. 120, pp. 107-117. Bozeman, October, 1917.

The experiments described were carried out at the Montana Experiment Station farm at Bozeman, in the Gallatin Valley in the south-central part of the State, at an altitude of 4,870 feet. The plots were $\frac{1}{10}$ acre in size. The tests were made with the principal varieties of cereals, sown in lines with a seed drill carefully calibrated to control the exact quantity of seed sown. The influence of different dates and rates of sowing on the yields of grain and straw, the weight of grain per bushel, the length of the period from planting to ripening, the height of the crop and the percentage of the crop lodged at harvest time, were carefully observed. The tests were made during 8 years for spring wheat, oats, and barley, and during 7 years for peas. The principal results obtained are given below:—

DATE OF SOWING.—The largest yield of grain was obtained with the earliest sowing. Yield from plants sown on April 15, 22, 29 and May 5, when compared with those from plants sown on May 13, 20, 27 and June 4, showed an average increase, in favour of early sowing, of 44.6% for spring wheat, 19.1% for oats, 11.7% for barley, and 10.6% for peas. There were but slight differences in the quantity of straw produced according to the date of sowing. Since late planting gave smaller yields of grain, the number of pounds of straw for each pound of grain pro-

duced was greater for crops sown late than for those sown early.

Early sown grain was of better quality than late sown grain, as shown by a higher average weight per bushel. The vegetative period of early sown grain was longer than that of late sown grain. This was doubtless due to the fact that the growth of plants sown late was arrested by autumn frosts and cool weather.

There was no marked difference in the length of straw of the plants sown at different dates. This is in agreement with the essentially uniform yields of straw. Lodging of cereals depends more on the season than the date of sowing.

RATE OF SEEDING.—The highest yield of spring wheat was obtained by sowing 14 pecks per acre. This was 2.6 bushels higher than the yield obtained with 8 pecks. Considering the higher price of grain in the spring, the most profitable yield was from 8-peck seeding. The best yields of oats were obtained with 10 to 12 pecks of seed per acre. Sowing 16 pecks per acre gave the best yields of barley. When other conditions, such as lodging, were considered, the best yields were obtained with 8 to 10 pecks of seed. For peas, the most satisfactory results were obtained with 10 to 12 pecks per acre.

The yield of straw increased in proportion to the amount of seed used.

The quality of the grain as shown by the weight per bushel was slightly better for spring wheat, oats and barley when larger quantities of seed were used. With peas the opposite was true. The larger the amount of seed used the shorter was the period from sowing to ripening. The amount of seed used should, therefore, be increased in proportion as the date of sowing is retarded in spring.

There appears to be no relation between the length of straw and the amount of seed sown in the case of spring wheat, oats, and barley. For peas, the length of the straw increased as the quantity of seed used increased. The higher the rate of seeding the greater was the tendency of the crop to lodge. It must be remembered that these data refer to irrigated crops at an altitude of 4,870 feet.

1104—Comparative Cultural Experiments With Several Varieties of Oats in South and Central Sweden.—AKERMANN, A., in *Sveriges Utsädesförenings Tidskrift*, Year XXVII, Pt. 6, pp. 261-278; Year XXVIII, Pt. 1, Malmö, 1918.

During the last 20 years the Svalof station aided by the various branches distributed throughout the different physiographical districts of Sweden, has created and tested several new and valuable varieties of oats which have replaced, or are replacing, the old native varieties which they exceed in quantity and quality of yield. As is known, the yield of a given variety varies from year to year according to the different weather conditions. To determine the climate of a

given locality it is necessary to make a series of observations over several years, and to determine the productivity of a given variety with respect to the climate it is also necessary to make comparative cultural tests for a more or less long period.

Among the oats produced at Svalof are the varieties Kron, Seger, Guldregn, Stormogul, Klock I, II and III, selected Dala, and others. Comparative cultural experiments made on several farms in south and central Sweden have made possible good approximate determinations of the characters of these varieties with respect to the special climatic and agricultural conditions of the different provinces, thus enabling a geographical distribution to be made on a rational and reliable basis. The comparative cultural tests may be divided into four parts:—

(1) Tests at Svalof, from 1900 to 1917.

(2) Tests in the provinces of southern Sweden (white oats district) from 1908 to 1917.

(3) Tests in Varmland, from 1908 to 1916.

(4) Tests of varying length in the provinces of central Sweden (black oats district).

Details are given for each set of tests. The Kron variety holds first place at Svalof; the white oats of the Seger variety are first in South Sweden, except that in one of the provinces Stormogul black oats surpass all white oats. In Varmland where drought resistant and very early varieties are necessary, the white variety Guldregn holds first place.

LIVE STOCK AND BREEDING

1126—Immunity Studies on Anthrax Serum

(1). Transformation of Pseudoglobulin into Globulin.—I. EICHORN, A., BERG, W. N. and KESLER, R. A., in *The Journal of Agricultural Research*, pp. 37-56, Bibliography of 11 Publications. Washington, D. C., January 8, 1917.—II. BERG, W. N., *Ibid.*, pp. 449-456, March 19, 1917. (2 pp. in *Institute Bulletin*).

I.—The immunity conferred by anthrax serum is of short duration, lasting only a few weeks. To produce a more lasting immunity SOBERNHEIM recommended a simultaneous treatment with serum and vaccine. EICHORN obtained good results from the use of serum and spore vaccine and found the method to possess advantages over the PASTEUR method. Numerous experiments undertaken demonstrated the value of anthrax serum as a curative agent and as a prophylactic when employed simultaneously with anthrax spore vaccine. Details are given in the *Institute Bulletin*.

1128—Efficacy of Some Anthelmintics.—

HALL, M. C. and FOSTER, W. D., in the *Journal of Agricultural Research*, pp. 397-447 + Bibliography of 30 publications. Washington, D. C., February 18, 1918.

Although the use of anthelmintic treatment is an old practice, the efficacy of the various

(1) See also *Agricultural Gazette*, October 1918, page 1015, No. 543.

substances employed as anthelmintics is not well known. The available information is based largely on clinical observations or on faecal examinations for worms passed and for eggs persisting in the faeces, which method is somewhat inexact. A more satisfactory one is to treat the animals, collect all the faeces passed for a number of days, and recover from them all worms present, and then to kill the animals and collect all worms remaining. This was the method employed by the authors. Their plan was to test as many drugs as possible having a known or alleged anthelmintic value, abandoning those which gave no results, and making further experiments with the more promising ones. The results are summarised in 5 tables, and, making due allowance for the paucity of data in regard to certain drugs, the writers consider that the following may be reasonably advanced as the result of their investigations.

Simple purgatives, calomel and castor oil, may have some light value as anthelmintics but it is hardly sufficient to justify their use for this purpose. Ascarids (*Belascaris marginata*) in dogs are sometimes removed by castor oil given as a preliminary purge, and this fact may prove of benefit in veterinary practice as a diagnostic measure when the more accurate method of microscopic faecal examination cannot be carried out. However, castor oil failed to remove ascarids more frequently than it succeeded, and in no case were all the ascarids removed from any one animal. As many of the experiments on dogs were preceded by a dose of castor oil, the writers have fairly extensive data on this subject.

The most reliable vermifuge for ascarids, whether in dogs or swine (*Ascaris suum*), is oil of chenopodium. This drug, which was tested on 34 dogs in 6 experiments, showed an efficacy for the entire series of 97 per cent. It rarely fails to remove all the ascarids present in a dog if given at the rate of 0.2 mil (milliliter) per kilo, preceded by a dose of castor oil and the animal starved for 24 hours before treatment.

The chenopodium treatment is also very efficacious for ascarids in swine, and when properly administered may be expected to remove most, if not all, of the worms present. It would seem, however, that neither chenopodium nor any other drug tested will give satisfactory results if mixed with the daily ration and the animals allowed to dose themselves; it is best given to each pig individually in suitable dosage, preceded by a fast.

Oil of chenopodium appeared to be effective for stomach worms in sheep (*Bunostomum trigonocephalum*) although the data on this subject are not sufficient to warrant its recommendation. It is also of some efficacy for hookworms in sheep and in dogs (*Ancylostoma caninum*) though in the latter case chloroform was found more reliable.

Other remedies which seem to have more or less merit as anthelmintics against ascarids are the latex of *Ficus laurifolia*, santonin

in repeated doses, and thymol. Although thymol in repeated doses is fairly efficacious against hookworms, it was inferior to chloroform for this purpose, causing more distress. An excellent preparation for mixed infestation in dogs consists of equal parts of oil of chenopodium and chloroform, given at the rate of 0.2 mil per kilo, combined with 30 mils of castor oil. This preparation may be expected to remove all the ascarids present, a large proportion of hookworms, and possibly a certain percentage of whipworms. This latter parasite seems to be very difficult to eliminate, and nothing tried by the writers proved very efficacious, almost any anthelmintic occasionally proving successful. This experience may perhaps be explained by an intermittent peristalsis of the caecum, which occasionally allows the anthelmintic to enter, but which usually excludes it. Although chloroform was fairly successful in removing stomach worms from sheep, both animals upon which it was tried subsequently died from its effects, and it would seem to be too dangerous for use on sheep.

In the case of stomach worms in sheep, copper sulphate (1% solution; 100 mils to sheep a year old, 50 mils to lambs under a year old) was found to be the most satisfactory remedy, the experiments confirming the findings of HUTCHESON. Petroleum benzene also proved satisfactory and was more efficacious for hookworms than copper sulphate. However, it is much more expensive than copper-sulphate solution, must be given three times, and in a vehicle like milk, which adds greatly to the expense. The fact that petroleum benzene (refined gasoline) proved efficacious, while commercial gasoline was considerably less so, is perhaps related to the differences in specific gravity and consequent volatility of the refined product compared with the commercial product.

Among anthelmintics intended for use against tapeworms, male-fern (*Dryopteris filix-mas*) proved efficacious when tested on dogs. In the case of cats it removed all tapeworms from 75 per cent of the animals tested, though it proved fatal to 2 out of 6 animals which were somewhat enfeebled from disease. Apparently it is more toxic to cats than dogs and should be prescribed with caution and only given to healthy subjects. So far as can be judged from a single experiment with dogs, there seems to be no danger in combining male-fern with castor oil, as is done in the so-called Hermann's mixture. In fact, the writers are inclined to agree with SEIFERT (1908) that the administration of castor oil after male-fern will avoid the toxic effect of the latter by causing its rapid and thorough elimination, and that for this purpose no other purgative is quite so effective. This subject, however, should receive more study before conclusions are drawn. Pelletierine tannate was a failure in the one experiment in which it was tested on cats, but was efficacious on dogs. No remedy was efficacious against tapeworms in poultry. Of the four drugs

tested, chenopodium gave the best results for this purpose, but its efficacy for tapeworms is very slight.

Turpentine proved the most efficacious of the remedies tested on poultry for the removal of *Ascaridia perspicillum*, while chenopodium was nearly as good. When tested on dogs and pigs, turpentine was not very efficacious; and, as it caused grave symptoms of nephritis in pigs and caused the death of some of the experiment dogs, its use upon these animals is inadvisable.

The treatment with chopped tobacco stems recommended by HERMS and BEACH for ascarids in poultry proved fairly efficacious for *Heterakis papillosa* and would presumably be at least as efficacious for *Ascaridia perspicillum*, since this latter worm is more easily reached by anthelmintics than is *H. papillosa*.

There are a large number of drugs showing a greater or less degree of efficacy for the various intestinal parasites of domestic animals. Usually their action is selective—that is, they show a pronounced efficacy for certain species of intestinal worms, while they are decidedly less efficacious or entirely inefficacious against other intestinal parasites. If we consider that the ideal anthelmintic is one which will remove all worms of a given class or species, and do this every time in a single dose, we find that very few drugs approach this ideal.

Among the drugs which have given the best results under experimental conditions for the purposes intended and concerning which the writers have sufficient data to warrant positive conclusions may be mentioned the following:—

- 1) Copper sulphate in drench for stomach worms in sheep.
- 2) Oil of chenopodium for ascarids in pigs and dogs.
- 3) Oleoresin of male-fern for tapeworms in dogs.
- 4) Turpentine for *Ascaridia perspicillum* in fowls.
- 5) Chopped tobacco stems for *Heterakis papillosa* in fowls.

1129—The Destruction of Ticks Found on Domestic Animals in New Zealand.—REAKES, C. J., in the *New Zealand Department of Agriculture, Industries and Commerce, the Journal of Agriculture*, pp. 83–86. Wellington, February 20, 1918.

1130—On a Mite of the Genus *Tyroglyphus*, an Accidental Parasite of the Horse.—CARFANO, M., in *La Clinica Veterinaria*, pp. 173–177. Milan, April 15, 1918.

1133—Albuminoids in the Feeding of Live Stock.—WIEGNER, G. in *Landwirtschaftliches Jahrbuch der Schweiz*, Year XXI, No. 1, pp. 42–64. Berne, 1918.

After considering generally the feeding of cattle the author discusses at length the part of albuminoids therein and shows that, in the new discussion on the minimum quantity

of albuminoids necessary in the feeding of man and animals (raised by the shortage of albuminoids and their rise in price through the war) account must be taken to a far greater extent than has hitherto been done of the biological value of the albuminoids, of the qualitative composition of the foods and fodders and the variable degree of digestibility.

The author believes that, even in times of scarcity, the absolute minimum of albuminoids must be doubled if waste of other food elements of great value is to be avoided, and especially if derangement of the organism is to be guarded against. He shows the reasons, based on abundant experimental data, which led him to form this opinion and shows the figures given later to be probably correct for the albuminoid requirement of live stock in so far as our theoretical and practical knowledge of feeding will enable us to judge.

Under better feeding conditions and with albuminoids of high biological value it is possible to recover, in the form of milk albumin, all the albuminoids fed, in addition to that which is indispensable to the maintenance of the dairy cow. It is also possible in practice and under the experimental conditions adopted by the author, to cause 350 gm. of digestible albuminoid contained in a ration to be transformed into 350 gm. of albumin contained in 10 litres of milk with a 3.5% albumin content. KELLNER, however, recommends under the same conditions almost a double quantity, that is to say 550 to 650 gm. of digestible albuminoids for 10 litres of milk.

1136—Tree Leaves in Live Stock Feeding.—

I. LHOSTE, A., in *La Vie agricole et rurale*, pp. 23-24. Paris, July 6, 1918. II. EZENDAM, F. A., in *Nederlandsch Weekblad voor Zuivelbereiding en Veetelt*, No. 16, p. 2. Doetinchem, 1918.

I.—The author (Director of the Mans slaughter houses, France) shows the value of tree leaves in the feeding of live stock. The food value of the leaves varies according to the vegetative period and the plant: as a rule it is higher in June and July than in September, and the leaves from the higher parts of the tree are richer in fibre. The plants containing the most nitrogen are alder, acacia, elm, lime, oak and maple.

The results of several chemical analyses made by M. A. CH. GIRARD (Professor of the Institut national agronomique) are given in detail. The average food value, in food units, of tree leaves at the end of July is 37.7, and that of meadow hay 31.

The leaves may be fed either green or dry. Green and dry leaves may be given to animals in the following quantities respectively:—horses and mules, 11 to 17.6 lb., 8.8 to 11 lb.; oxen, 22 to 33 lb., 13.2 to 22 lb.; sheep, 5.5 to 6.6 lb., 2.2 to 3.3 lb. Various specimen rations are given in the article in the Institute Bulletin. *

According to the author (of the Royal

Agricultural Experiment Station of Wageningen, Holland) the food value of dry leaves is about equal to that of medium quality hay. The date and hour at which the leaves are harvested influences their food value. The dry matter content is highest and the nutritive constituents most abundant in July and August. Towards autumn the tannin content increases and digestibility is no longer so good. The leaves are obviously richest in starch in the evening owing to the formation of chlorophyll. Dry leaves must not be exposed to the sun and must be protected from rain. Trees capable of supplying suitable food are acacia, birch, elm, poplar, lime, chestnut, ash and willow; beech and oak are less suitable.

1137—Investigations into the Composition of Seaweeds with a View to their Utilisation as Cattle Food, in the Netherlands.—DE BRUYN, B. R., in *De Veldbode* No. 807, pp. 504-505. Maastricht, 1918.

In the absence of other roughages, seaweeds may be fed to cattle when the sodium chloride has been sufficiently removed. (1)

1141—The Utilisation of the Stomach Contents of Slaughtered Cattle for Feeding Pigs.

—*Feuille d'Informations du Ministère de l'Agriculture*, Year XXIII, No. 24, p. 10. Paris, June 11, 1918.

The blood and stomach contents of slaughtered cattle may be utilized by the pig.

At the moment of slaughtering the stomach of a ruminant contains various sorts of masticated food mixed with mucus and gastric juice. These foods are in a more or less advanced state of digestion, having been acted on by bacteria and the gastric juice for a varying period of time. Directions for their use have been issued in France and Germany.

Instructions were also added to obtain a better food ration for pigs by using 220 lb. of stomach contents plus 4.4 galls. of blood, 44 lb. of turf treated with molasses, 3 3 lb. of salt and a little chalk. It was admitted that 100 lb. of this mixture had the same food value for the pig as 400 lb. of potatoes.

1142—Researches on the Specific Distinction Between the River Trout, Lake Trout and Sea Trout and the Acclimatisation of Fresh Water Trout to Salt Water.—MURISIER, W., in the *Archives des Sciences Physiques et Naturelles*, Year CXXIII, Period 4, Vol. 46, pp. 97-99. Geneva, 1918.

AGRICULTURAL MACHINERY AND IMPLEMENTS

1144—Motorculture by Electricity.—GOUY, P., in the *Revue de Viticulture*, Year XXV., Vol. XLVIII, No. 1232, pp. 87-89. Paris, February 7, 1918.

After discussing the part that motorculture by electricity should play and its advantages,

(1) See also *Agricultural Gazette*, October 1917, page 916, No. 123.

the author states that if electrical motor-culture is to be more generally possible, the large electric works—at present rather scattered and supplying energy chiefly for the urban and industrial centres—should not be depended upon too much, but rather that recourse should be had to other sources of electricity which already exist and could be utilized with advantage.

In the mountains as well as in the hill and plain country there are thousands of little waterworks, mills, etc., which often have more power available in the season than they can utilize. It would be very easy to install turbines or water wheels to drive dynamos, which at small cost would supply a few horsepower to the surrounding estates. This power, divided among the farms, would not only light the houses and stables, but would also run fixed motors for farm work and movable motors for cultivating the soil. In France it is estimated that such small sources give a total of about 1 million H.P., a figure that could be much increased. In fact, many small falls in the country districts of France are not utilized at all. With the help of local initiative, either private, communal or from syndicated groups who would divide the energy among themselves or supply their neighbours, hydro-electric installations could easily be established. Such simple and efficacious combinations would have the advantage of generalizing the use of electricity for cultivation and of hastening the utilization of the water-power as well as the most necessary agricultural progresses.

The author quotes the Senator CHAUVEAU as to the prices of the H.P.-hour for ploughing:—1) with a steam windlass locomotive burning 7.7 lb. of coal at \$6 per ton the cost is 3.8 cts.; 2) with a paraffin engine, 2.9 cts.; 3) with a high-tension electric current at 1.9 cts. the kilowatt the cost is 0.16 cts. He also quotes the French Minister of Agriculture, M. F. DAVID, to the effect that the water-power kilowatt used for cultivation costs from 0.76 cts. to 2.8 cts., while that obtained from coal costs 2.8 cts. to 6.28 when coal cost \$7.80 a ton.

1146—The Production of Agricultural Material and the Maximum Prices for Agricultural Machinery and Implements, in France.—I. MARIS-BESNARD, in the *Bulletin mensuel de la Chambre Syndicale des Constructeurs de Machines Agricoles de France*, pp. 169-175. Paris, June, 1918. II. *Feuille d'Informations du Ministère de l'Agriculture*, pp. 9-10. Paris, July 16, 1918.

The results of an inquiry made by M. MARIS-BESNARD, President of the "Chambre Syndicale des Constructeurs de Machines Agricoles de France".

The author thinks that, in order to estimate the French output of agricultural material, the number of workmen employed in French works must be used as a basis because, according to the evidence available, it can be shown that the market value of the products of a

manufactory divided by the number of workmen gives a market value per workman that agrees very closely for similar industries with equal equipment.

For a large number of manufacturies this figure is 6666 francs (about \$1,286). One manufacturer who is best equipped and works in series, can arrive at 20,000 francs per workman. With smaller firms a figure slightly less than 6,000 fr. is arrived at.

The "Chambre Syndicale des Constructeurs de Machines Agricoles de France" unites 410 firms making machinery tractors, agricultural implements, appliances for dairying and agricultural industries. DEBRAY's yearbook of Agricultural Construction mentions 1,500 small firms making ploughing implements with 2 or 3 workmen, and which altogether represent about 1,500 workmen.

Besides this there are thousands of workmen, farriers, smiths and ploughwrights that buy parts of the machines and assemble them. Their production can be estimated from the quantity of material supplied to them.

The author summarises in table form the chief elements of French prewar construction, using as basis documents and information supplied by the more important makers. No mention is made of the production of machines for mechanical cultivation—tractors, windlasses, etc.—which, in an embryonic stage before the war, is now undertaken by 22 firms, forming part of the Syndicate, and able to produce thousands of machines annually.

This table shows that the number of Brabant ploughs made in France in 1913 was 40,000 (64 syndicated firms) while that of various ploughs was 200,000 (2,000 small makers); the number of cultivators, harrows, rakes, was 150,000, and that of rollers was 50,000; 6,000 machine drills and manure distributors (10 firms) and 12,000 drills (11 firms) of various types were made; 5 firms made 10,000 mowers, and 7 made 3,000 harvesters and binders; 3,000 threshing sets were made by 48 firms; the number of agricultural motors made rose to 2,800 for 21 firms and 3,200 for the non-syndicated firms; 25 firms made 40,000 pumps; 27 makers made fixed farm machinery (root-choppers, mills, sifters, etc.) to the number of 230,000; the number of presses and apple-pounders, etc., rose to 180,000; 30,000 dairy appliances were made in 1913; about 100 firms made various types of implements, etc.

The production could be increased by 15 to 20%, on taking into account about a thousand small, non-syndicated firms employing 2 or 3 workmen. The table also shows the tonnage produced (129,350 metric tons) and its market value (\$25,511,000).

II.—The French Minister of Agriculture has given his approval to the list of maximum prices for agricultural implements and machinery, proposed by the presidents of the "Chambre syndicale des constructeurs de machines agricoles", the "Chambre syndicale du commerce des machines agricoles", the "Consortium des fabricants de machines

d'agriculture" and the "Consortium des industriels de la ferrure".

The maximum prices thus fixed for French and foreign-made machines respectively are:—

\$145 and \$150 for 1-horse mowers; \$164 and \$169 for 2-horse mowers; \$222 and \$227 for reapers cutting 49 in.; \$227 and \$232 for reapers cutting 53 in.; \$235 and \$239 for reapers cutting 59 in.; \$246 and \$251 for binders cutting, 59 in.; \$463 for foreign-made binders cutting 83 in. (on account of increased freights, the delivery price of foreign-made binders includes an increase of \$77, that of foreign reapers, \$39, and that of foreign mowers, \$29); \$102, \$105 and \$108 for French horse-rakes with 24, 26 and 28 teeth; \$94 and \$98 for foreign horse-rakes of light type with 26 to 32 tines; \$188 and \$212 for tedders 96 in. wide; \$183 and \$188 for tedders 71 to 96 in. wide; \$130 and \$147 for fork tedders (6 forks with 4 tines). The maximum price for sisal and manilla binder twine is fixed at 50 cts. the lb.

As regards all-metal ploughs (save those specially made for tractors), the maximum price has been fixed at 35 cts the lb. for those weighing up to 242 lb.; at 33 cts the lb. for those from 242 to 330 lb.; and at 31 cts the lb. for those weighing more than 330 lb. For weeders, scarifiers, with steel frames and rigid or spring tines, the maximum price is 23 cts the lb.; for metal harrows, 22 cts the lb. for 1-row hoes, 35 cts the lb.; for hoes for more than one row, 26 cts the lb.; for steel-sheet rollers, 12 cts the lb. and for those in cast iron, 11 cts the lb.

1147—Exports of Implements, Twine, Tractors and Gas Engines from the U.S.A. for the Period 1915 to 1917.—*Farm Implement News*, p. 21. Chicago, April 4, 1918.

The exports of implements, tractors and gas engines from the U. S. to other parts of the world from 1915 to 1917 inclusive is shown in the following Table:—

Articles exported	1915		1916		1917	
	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		\$
Hay rakes and tedders ...		212,934		301,115		777,583
Mowers and reapers ...		4,367,181		7,347,406		12,740,298
Planters and seeders ...		274,391		340,437		431,358
Ploughs and cultivators ...		3,371,915		5,202,047		7,592,145
Threshers ...		1,563,245		1,933,974		2,749,785
Parts, etc. ...		3,793,183		6,104,755		9,222,570
Total ...		13,582,849		21,229,774		33,513,739
Binder twine ... lb	108,241,737	8,601,520	156,189,298	15,317,309	129,705,369	20,163,041
Stationary gas engines ... No.	2,415	457,409	3,446	406,297	6,083	840,175
Stationary petrol engines	20,039	1,549,242	33,231	2,886,275	27,550	3,240,196
Traction and caterpillars (petrol) ...	660	1,303,209	3,989	6,208,868	14,233	16,155,184
Kerosene engines ...					6,539	2,009,915

1148—The Price of Binder Twine in the U. S.A. in 1918.—*Weekly News Letter*, U.S. Dept. of Agriculture, p. 4. Washington, May 22, 1918.

The pre-war price for sisal averaged about 7 cents per lb. It was 7½ cents landed at ports of entry in June, 1916. In July of the same year, it was increased to 10 cents at which price it remained till December, 1916, when it rose to 16½ cents in March, 1917. In August 1917, it reached 19 cents at Gulf ports and 19¼ cents delivered at New York.

The cost of binder twine from sisal and other sources has been officially fixed for 1918 at 23 cents f. o. b. factory for 500 ft. twine, other grades being in proportion. The wholesale price is slightly higher to allow the dealers a fair profit. An ample supply of binder twine was assured for the harvest.

1150—Rotary Harrow Attachment for Sulky and Multiple Gang Ploughs.—POTTER, P.

B., in the *Scientific American*, No. 22, p. 502 New York, June 1, 1918.

The rotary harrow described consists of a single gang of closely spaced spading discs. Each disc is made up of a number of sharp, steel blades, which are narrow and have a curved and twisted shape.

As the discs roll along, the blades stab and slice the furrow to pieces, and as there is a considerable number of blades, the surface is left with a fine even mulch. There is a lever for regulating the depth and a spring for adding pressure to the blades. As the discs have rather a revolving action than a dragging one, there is only an increase of 7 to 10% in the draught on the plough. The attachment is made to clamp tightly to the plough frame and is readily adjustable in any direction; it can be purchased for the single-bottom sulky or the multiple-bottom engine gang.

As the soil is freshly ploughed, it is more easily pulverised, provided the ploughing has been done under the right conditions.

1151—The Production of Groats and Oatmeal.—*The Implement and Machinery Review*, p. 182. June 1, 1918.

Description of an oat milling plant, with figures showing the arrangement of the plant in a simple building, according to the plans of A. R. TATTERSALL & Co., milling engineers 75D, Mark Lane, London.

AGRICULTURAL INDUSTRIES

1158—The Capacity of Wheat and Mill Products for Moisture.—STOCKHAM, W. L., in *Bulletin No. 120 of the North Dakota Agricultural Experiment Station*, pp. 97-131 Agricultural College, North Dakota, January 1917.

1161—Vinegar from Waste Fruits.—CRUESS, W. V., in the *University of California College of Agriculture, Agricultural Experiment Station, Bulletin No. 287*, pp. 169-184 Berkeley, California, October, 1917.

1164—The Condensed Milk Industry in Japan.—Abstract from the *Jiji Shimpoo*, April 23, 1918 in the *Department of Trade and Commerce, Canada, Commercial Intelligence Branch, Weekly Bulletin*, Vol. XVIII, No. 750, pp. 893-894. Ottawa, June 10, 1918.

1166—The Churning of Sweet Cream and Acid Cream: Investigations in Sweden (1).—HESSELBERG, O., in the *Nordisk Mejeri-Tidning*, pp. 267-269. Stockholm, June, 1918.

The author seeks to determine whether it is more advantageous to churn sweet cream or acid cream. It has been determined that the yield is almost identical in both cases.

The method usually adopted in churning sweet cream is as follows:—the butter-milk is skimmed and the cream obtained added to the other cream obtained during the day. This is a great mistake from the point of view of both yield and quality. If, on the other hand, the "buttermilk cream" is churned a second time one week later, when it is "ripe" the yield is excellent.

The advantages of churning sweet cream are:—

- 1) it is unnecessary to acidify the cream;
- 2) defects in quality due to the acidification of the cream are avoided;
- 3) butter made from sweet cream keeps much better than that made from acid cream; the author showed that, in the first case, butter was perfectly fit for consumption even after two or three months, whereas, in the second case, it deteriorated after fifteen days; these superior keeping properties are seen especially during the summer and autumn months.

1168—The Preservation of Meat: Researches on the Presence of Living Elements in Normal Muscular Tissue (Parasitism and Microbiosis).—GALIPPE, V., in the *Comptes Rendus de l'Académie des Sciences*, Vol. CLXVII, No. 4, pp. 178-180. Paris, 1918. Many workers (BÉCHAMP, NENKI and GIACOSA, BILLROTH and FIEGEL, BURDON-SANDERSON, GAUTIER and ETARD) have demonstrated the presence of living elements in muscular tissue and the autonomous persistence of intracellular life. The author, having carried out further work on the question, gives his conclusions which are of interest from the standpoint of food hygiene.

(1) See also *Agricultural Gazette*, December, 1918, Page 1194, No. 819.

AGRICULTURAL ECONOMICS

THE POSITION OF AGRICULTURAL CO-OPERATION IN CALIFORNIA IN 1917

The increasingly marked activity of the State Market Director of California, as it affects co-operative organization in this State and is exercised in virtue of article 3 of the Act of 10 June 1915, amended on 1 June 1917, has obtained the happiest results. It has allowed the constitution of important co-operative societies, even of a federation of co-operative marketing societies, and has thus made it possible to control the price of produce and to ensure a maximum price to producers, who have especially benefited by a lessening of the disastrous consequences of slumps and by an elimination of middlemen. The article presents in detail the business of the principal co-operative marketing associations in 1917.

The following are the leading associations:

- 1) *Citrus fruits.*—California Fruit Growers' Exchange, Los Angeles; Mutual Orange Distributors, Redlands.
- 2) *Deciduous fruits.*—California Fruit Exchange, Sacramento; Central California Berry Growers' Association, San Francisco; California Pear Growers' Association, Martinez; Sebastopol Apple Growers' Union, Sebastopol; Vacaville Fruit Growers' Association, Vacaville; Watsonville Apple Distributors, Watsonville.
- 3) *Dried fruits.*—California Associated Raisin Company, Fresno; California Peach Growers, Fresno; California Prune and Apricot Growers, San Jose.

4) *Dairy Products*.—Associated Dairymen of California, Sacramento; Associated Milk Producers, San Francisco; California Milk Producers' Association, Los Angeles; Milk Producers' Association of Central California Oakland; Milk Pooling Association of San Diego County, San Diego; Northern California Milk Producers' Association, Sacramento; San Joaquin Valley Milk Producers' Association, Fresno.

5) *Nuts*.—California Almond Growers' Exchange, San Francisco; California Walnut Growers' Association, Los Angeles.

6) *Poultry*.—Poultry Producers of Central California, San Francisco; Poultry Producers of Southern California, Los Angeles.

7) *Miscellaneous*.—California Associated Olive Growers, San Francisco; California

State Beekeepers' Association, Modesto; California Lima Bean Growers' Association, Oxnard; Escondido Vegetable Growers' Association, Escondido; Lima Bean Growers' Association, Sacramento; Thermal Cantaloupe Growers' Union, Thermal; Turlock Merchants and Growers, Turlock.

THE CALIFORNIA FEDERATION OF FARMERS' CO-OPERATIVE MARKETING ASSOCIATIONS.

A great step forward in the matter of marketing Californian products was realized when this federation was formed in 1917.

The constitution of the federation was drafted in April and completed in October with the help of the State Market Director. The following associations signed the agreement:

Name	Annual value of output	Number of votes	Fee
	\$		\$
California Peach Growers.	5,000,000	10	1,666 00
California Associated Raisin Co.	11,000,000	20	3,666 66
California Prune and Apricot Growers . . .	8,000,000	16	2,666 66
Poultry Producers of Central California	1,800,000	4	600. —
“ “ Southern “	751,000	2	250 33
California Associated Olive Growers.	350,000	1	116 66
Central California Berry Growers	500,000	1	166 66
Sebastopol Apple Growers	400,000	1	133. 33
Associated Dairymen of California	—	—	—

The agreement comprises the by-laws of the federation which aims at securing that the federated associations co-operate wherever their common interests are involved, interchange their ideas and experiences, secure collectively data as to forms of organization and the restrictions which may be placed on co-operative marketing, organize marketing, scientifically with a view to increasing demand and finding new markets outside California, organize the collective purchase and production of material and other requisites for all or some societies, organize the transport of produce, find on good terms the credit needed by the societies, set up and maintain a labour bureau, etc.

At general meetings of the federation each federated association has one vote for each \$500,000 or major fraction of such value of farm products which it handled in the previous year. Figures are based on prices realized at f. o. b. sales point, California, confirmed and made binding by the federation's executive council. No association may have less than one or more than twenty votes in the federation.

The executive council is composed of the federation's chairman and secretary, a person

selected by and holding office at the pleasure of the State Market Director, and four persons annually elected by the federation's September meeting. This council initiates and carries out plans accordant with the federation's purposes, subject to the approval and instructions of the general meeting.

Associations admitted to membership pay as fee one thirtieth of the value of the products they handle each year, but no one of them may pay an annual fee less than \$100 or more than \$5,000.

The active work of the federation is carried on by seven circles, each of which is composed of from three to seven persons selected by the chairman from the delegates, officers, directors or employees of the federated associations. The said circles cover the fields of:

- (1) Domestic markets and advertisement,
- (2) Markets outside California,
- (3) Legislation,
- (4) Tariffs and problems of transport,
- (5) Co-operative purchase,
- (6) Labour,
- (7) Finance and credit.

The executive council's secretary is secretary *ex officio* of each circle and the chairman a member of each circle.

Each circle must make a plan or plans for solving any or all of the problems arising within its field; and must prepare a scheme in contract form for presentation to the federated associations, for whom this scheme becomes binding if they accept it in writing. The federation as a whole cannot be bound by any activities of the circles without the unanimous vote of the executive council and of the general meeting. The number of the circles may be enlarged.

Any federated association may withdraw from the federation if it give notice to the executive council's secretary at least 30 days before the September meeting in any year. Such resignation becomes effective from the following 31st of October.

The federation must meet at least four times a year, in March, June, September and December; the executive council at least once a month; each circle as often as it may determine.

The federation's agreement, as signed by the federated associations, is binding for ten years.

The list of signatories to the agreement does not represent the federation's full strength, for many associations in full sympathy with the movement have not yet signed.

In December, 1917, the whole organization was still provisional.

AGRICULTURAL RECONSTRUCTION IN THE UNITED KINGDOM

The Agricultural Policy Sub-Committee of the Reconstruction Committee, appointed in August, 1916, to consider and report upon methods of effecting an increase in the home-grown food supplies, having regard to the need of such increase in the interests of national security, has just issued its report which is a full exposition of the position of agriculture in this country. It opens with an historical preface which is a brief survey of agricultural conditions during the last hundred years and the political and social factors exercising an influence on them; and it proceeds to deal in detail with the various problems connected with British agriculture. A number of more or less drastic recommendations are made by the committee with the object of ensuring agricultural reconstruction.

The subjects dealt with include:

- (1) Effects of the agricultural depression;
- (2) Need for a new agricultural policy;
- (3) Agricultural wages;
- (4) Price of wheat and oats;
- (5) Effect of guaranteed prices on rents;
- (6) Method of securing increased production;
- (7) Sugar beetroot;
- (8) Scope and limitation of the inquiry;
- (9) The departments of agriculture;
- (10) Organization and co-operation;
- (11) Agricultural credit;
- (12) Small holdings, ownership, and tenancy;
- (13) Village reconstruction, village industries, and rural life;
- (14) Tithe redemption;
- (15) Local taxation;
- (16) The Agricultural Holdings Act;
- (17) Reclamation and drainage;
- (18) Deer forests;
- (19) The elimination of pests and weeds;
- (20) The supply of artificial manures;
- (21) Weights and measures; and
- (22) Transport.

The following is a brief summary of the abstracts from the Report published in the Institute Economic Bulletin. In presenting this summary present conditions are particularly considered.

The sub-committee points out that the experience of the war has shown that the dependence of the United Kingdom on imported food has already involved the country in special difficulties, and in the future may become a source of real danger,

It has increased the cost of the war; aggravated the difficult problem of regulating foreign exchange; and absorbed an undue proportion of the tonnage of the mercantile marine at a time when its services have been so sorely needed for other purposes. In some future struggle the comparative independence of the United Kingdom from a supply of food from overseas might be a determining factor of victory. Apart from these grave considerations, it is evident that, the financial and physical welfare of the country demands that the productive capacity of the soil should be developed to the fullest extent. Burdened with a huge debt, the nation will be strongly interested in producing as much as possible of its food at home, in order that it may buy as little as possible abroad. Exhausted in man power, it will find in the expansion of the rural population of these islands the best restorative of its vitality and creative energy.

As the years pass by and agriculture becomes more intensive in the United Kingdom, an increase of production will be reached which would now appear impossible to many farmers, and if the agricultural policy recommended is carried out steadily and continuously, a great change will be effected within a generation.

Results can only be produced in the United Kingdom as in Germany by a constant and consistent policy. The State must adopt such a policy and formulate it publicly as the future basis of British agriculture, and explain to the nation that it is founded on the highest considerations of the common weal.

The causes of bad estate management and farming are lack of suitable education or of capital (often found in combination) on the part of landowners and farmers, the personal equation of character, the excessive encouragement of game, the acquisition of land for the sake only of its amenities, and the conviction that the State has no interest in the treatment of agricultural land, and that it is the concern only of the individuals dependent upon it.

The general average of farming must be steadily and continuously raised throughout the United Kingdom; the grass land and the arable land alike must be extensively cultivated; the improvement of live stock, for which landowners and farmers have done so much even through the years of acute depression, must be progressive; much grass land must be reconverted into arable; the sugar beet industry and the manufacture of potato products can be introduced into British agriculture to its great advantage; estates must be managed with a single eye to maximum production; capital must be attracted to the industrial equipment and improvement of the land and to the operations of intensive farming; agricultural labourers be provided with an adequate supply of good cottages; small holdings both of owners and of occupiers must be fostered to provide a "ladder" for the agricultural labourer and for the demobilized sailors and soldiers; the organization of agriculture must be developed; the country must be permeated with a complete system of agricultural education; the status of the department of agriculture must be improved and their powers enlarged and reinforced by association with existing agricultural and administrative bodies, both national and local. A basis of security and stability of the conditions under which agriculture is to be carried on in the future must be the foundation of the whole structure, and without it the increase of production, which is predicted, cannot be realized. The conditions of agriculture must be so stable that out of its profits the agricultural labourer can be assured a fair wage, the cultivator of the soil a fair return for his capital, energy, and brains, and the landowners a fair return for the capital invested in the land. This stability can never exist so long as there is a possibility of a recurrence of the prices of the late period of depression.

The State should fix a minimum wage for the ordinary agricultural labourer in each country, guarantee to the farmer a minimum price for wheat and oats, and take steps, as set forth in later paragraphs, to secure the increase of production which is the object of the guarantee. The cereal crops are the pivot of agriculture, and it is not considered that dairy stock and stock farming will in any way be prejudiced by these proposals. The interests of the State demand that more land should be put under the plough, and any landowner and dairy or stock farmer, who chooses to convert part of his grass land into arable, could at once obtain the benefit of the guarantee and at the same time increase the output of his particular products. It is the opinion of the subcommittee that if the State, for reasons of general policy, were to adopt a tariff on manufactured goods, then a tariff corresponding in degree (with the necessary differentiations between the products of the empire, of allied, and of other countries) should be imposed on imported

foodstuffs such as dairy produce, meat and corn, and that special consideration should be shown to the produce of the more intensive forms of agriculture (of which fruit and hops and flax may be cited as examples), where the capital invested and the annual expenditure in cultivation and the proportion of that expenditure on labour, are particularly large.

The sub-committee recommends that the Board of Agriculture should be empowered temporarily to supersede the landowner in the management of the estate for all purposes essential to agriculture. It should put the estate, or such portion of the estate as it might deem necessary (except the mansion and the garden and park, if any, attached to the mansion), for a period of five years, into the hands of a manager, whose salary should be fixed by the Board of Agriculture and made a charge upon the estate. He should have the same powers in respect of the management of the agricultural land included in the estate as the owner had, and he should manage the estate as trustee for the owner. He should be a man of proved experience and capacity in the management of an agricultural estate, and he should render a yearly report and statement of accounts to the owner and to the Board of Agriculture. The balance of income, if any, derived from the estate after the payment of the necessary outgoings should be remitted half-yearly to the owner by the Board of Agriculture. If there has been no change of ownership within the period, the Board of Agriculture should be empowered to hand back the estate to the original owner at its termination if it was satisfied that the future management of the estate would be satisfactory. If it was not so satisfied, then it would continue to manage the estate for another quinquennial period, and so on from five years to five years, until there has been a change of ownership. The owner should throughout be undisturbed in the exercise of sporting rights over the estate subject to the power of the manager of the estate to prevent those sporting rights being exercised in a manner detrimental to agriculture or forestry. During the period of supersession the power of the owner to make any fresh charges on the estate, or part of the estate, should be suspended, and the existing charges on it, whether by way of mortgage or of settlement, should be paid out of the proceeds of the land by the Board of Agriculture.

There can be no hope of a satisfactory development of agriculture as long as the demand for cottages remains unsatisfied. The provision of these cottages should be taken in hand without a moment's avoidable delay. The sub-committee favours the improvement of the amenities of rural life, the reconstruction of stagnant villages, and the provision of an agricultural "ladder" for the labourers of small holdings.

The first thing necessary after the war will be to unite the whole department of agricul-

ture under one roof. Proper administration is quite impossible when a department is scattered into a dozen separate houses in half a dozen different streets. The minister in charge of the department should be styled, as now, President of the Board of Agriculture, but his salary and status should be raised to an equality with that of the President of the Board of Trade and the President of the Local Government Board.

As in Scotland, so in England and Wales, the War Agricultural Committees of the County Councils should be replaced by statutory committees, which, when constituted, should have powers of action independently of the County Councils, as in the case of the corresponding committees in Ireland and of the Education Committees in England. They should be composed of men and women who are not members of the County Councils as well as of members of the County Councils, but in both cases alike it is essential to secure the services of persons with practical knowledge of agriculture or some other branch of rural economy, or representative of some special rural interest rather than of the different districts of the county.

A County Council should have the power to set up more than one Agricultural Committee within its area, and the Agricultural Committee should have power to form District Sub-Committees.

The Agricultural Committees of England should elect two representatives from each County Council area to serve on the English National Agricultural Council, already suggested in this report. The President of the Board of Agriculture should nominate to it persons representative of all agricultural interests, so that, however, the total number of nominated members shall not exceed one third of the council. The President and the Parliamentary Secretary of the Board of Agriculture should be *ex officio* members. The council so composed should meet at least twice a year to discuss questions of agricultural policy brought before it by the president or by any of its members on due notice given, and the president or, in his absence, the parliamentary secretary should preside over its meetings.

The Welsh Agricultural Council already in existence is to continue and be presided over by the President and Parliamentary Secretary of the British Board. There should be an Agricultural Committee for England and Wales to meet regularly or when summoned.

The proposed annual estimates should be laid before the committee and discussed by it before being laid on the table of the House of Commons, and when so laid they should be accompanied by a memorandum expressing the opinion of the committee upon them. All resolutions of the committee should be laid upon the table of both Houses of Parliament if so directed by them.

If these recommendations are adopted there will be in existence in the United

Kingdom four National Agricultural Councils representing agriculture in Ireland, Scotland, England and Wales. The sub-committee suggests that it would be of great advantage to agriculture if delegates from these councils, say, thirty for England and five for Wales, and ten each for Scotland and or Ireland, were to meet in conference once a year. The conference should never be held two years running in the same country, but in each country in turn, and the minister responsible to parliament for the agriculture of the country in which the conference is held should act as its president for the occasion. An officer of one of the departments of agriculture should be permanent secretary of the conference, and responsible for the custody of its records. The result of such conferences would be to diminish the chances of friction between the three departments, to encourage the pursuit of a common policy, and to inform public opinion of the special difficulties and needs of agriculture and of its magnitude and importance as an industry. It would be a great encouragement to agriculture if His Majesty the King would graciously consent to become permanent patron of the conference of the combined councils.

There is something special to be said about the education of women who can play a great part in the reconstruction of agriculture after the war and whose intellectual interest in country life must be surely aroused if we wish to secure an increased rural population. It is hoped that numbers of the women who have been working on the land during the war will wish to remain in agricultural occupations and to avail themselves of the openings which will be presented to them in many branches of farming, such as dairying in its various forms, pig-breeding, and poultry keeping. Every possible encouragement should be given to women so disposed and the agricultural colleges should see to it that their courses are made suitable to them, and that the posts of lecturers are as open to fully qualified women as to men.

The subject has already been fully dealt with in the report (1915) to the Board of Agriculture and Fisheries of the Agricultural Education Conference (Agricultural Education for Women), which did such a great service in stimulating an interest in agricultural education. The sub-committee expresses its complete concurrence with the following reflection extracted from paragraph 2 of the report: "It is between 14 and 16 years of age that so many of the girls brought up in rural districts at present lose touch of country life. No matter what facilities for agricultural education may be offered to them later, these girls will have neither the taste nor the aptitude for it. This is a matter for serious consideration in view of the fact that it is women no less than men who are responsible for rural depopulation, and that there is no inducement in the form of higher wages which will tempt them to return." The fact

is that the local conditions which have brought about rural depopulation, bad housing, low wages, lack of prospects, affect women even more than men, and that the influence of women might be exerted in the opposite direction if they had been taught to make more comfortable homes with less drudgery, and if they had the necessary knowledge to enable them to build up a social order in which the natural advantages of country life could be made to counterbalance the artificial attractions of the town.

The intimate connection between a plentiful supply of agricultural labour and an increase in the output of home-grown food—the primary object of reference—was recognized in the early stages of the inquiry, and the recommendation with regard to farm wages contained in Part I of the report was framed to meet the competition of other and better paid industries. But, the question is not merely one of wages; the conveniences and interests of town life exercise an attraction upon the young rural labourer which can only be met by offering counter attractions in the country districts; and no agricultural policy will be worth having which does not aim at a better developed social life in our villages, at the introduction of fresh industries in the country districts, and at a large increase in the rural population. To this end an effort must be made to break through the stagnation in the life of too many villages by offering better opportunities for social intercourse and amusement, by arousing a stronger feeling of corporate existence and responsibility, and by opening out improved prospects of advancement to the energetic and hard working. With the advance of education a desire for greater opportunities has arisen among the more active and ambitious of the younger generation, causing them to covet the greater scope for their energies offered in urban districts. The proposals made under this head of the report are designed to lessen the despondency of outlook sometimes associated with existing conditions and to provide a machinery, which does not at present exist, for the improvement of village life.

The difference between villages, even in the same neighbourhood, is often marked. Some seem to carry outward evidence of the prosperity and happiness of their inhabitants

while the aspect of others, less fortunate, seems to indicate with equal plainness a dull and colourless outlook. In the former are seen smiling gardens, well cultivated and conveniently situated allotments, cottages in good repair, village playgrounds, and social clubs and reading rooms; in the latter, with land in abundance around, we find cottages possessing no gardens or insufficient gardens, huddled together so as to reproduce some of the evils of town slums, and absence of all the amenities of life, and allotments so distant from the centre of the village as to be difficult of access and inconvenient for cultivation, the whole presenting an appearance indicative of the conditions prevailing therein. Inquiry will usually show that the difference is due to the fact that in one village a guiding spirit has exercised a sustained policy of development, based upon a clear perception of the requirements of the inhabitants and a study of the best means of providing for them, while the other has been without these advantages. In this connection it has been pointed out that an examination of the maps of the Ordnance Survey reveals how lacking in system has been the development of the ordinary village. In its midst, even adjoining the village street, may be often found land let with large farms, which might better be used for housing or other public purposes, for providing gardens, cow pastures or allotments, or for occupation with adjacent cottages. But it is no one's business to take the lead in demanding a better scheme of use for the land, nor does any machinery exist by which a rearrangement could be carried out. An atmosphere of stagnation prevails, and it is not surprising that the best men in such districts prefer to try their fortune in places offering greater scope for their ambition. The less efficient remain, and the deterioration in the rural working population, of which complaint is often made, becomes an accomplished fact.

The sub-committee is of opinion that the machinery of the Parish Council, the Agricultural Committees of the County, and the Board of Agriculture should be utilized for the purposes of village reconstruction, and that under proper conditions the necessary land should be acquired by compulsory powers if it cannot be acquired by voluntary agreement.

AGRICULTURAL STATISTICS WORLD'S LIVE STOCK

BY T. K. DOHERTY, LL.B.

FROM the statistics that have been supplied during the last year to the International Institute of Agriculture by the adhering Governments, it is possible to present as follows a table by means of which a useful comparison may be made between a period near the

present date and a period immediately preceding the war. As data are not available in every case for 1918 nor for 1914 we present for comparison the data nearest to these years, and indicate the increase or decrease between the earliest and the latest years.

TABLE A

Countries	Date of enumeration	Horses	Milch cows	Other cattle	Sheep	Pigs
Great Britain and Ireland.....	June 4, 1918 June 4, 1914	2,204,367 1,915,533	4,586,758 4,576,852	7,685,706 7,567,711	26,965,521 27,886,095	(b) 2,804,000 3,939,887
France.....	July 1, 1917 Dec. 31, 1913	(+ 288,834) 2,282,560 3,222,080	(+ 9,906) 6,238,690 7,794,270	(+ 117,995) 6,204,614 6,993,440	(- 920,574) 10,586,594 16,131,390	(- 1,135,887) 4,200,280 7,035,850
Denmark.....	Feb. 5, 1918 July 15, 1914	(- 939,520) 510,615 567,240	(- 1,555,580) 1,048,764 1,310,268	(- 788,826) 1,092,920 1,152,594	(- 5,544,796) 247,213 514,968	(- 2,835,570) 513,012 2,496,706
Spain.....	Dec. 31, 1916 Dec. 31, 1912	(- 56,625) 488,715 525,853	(- 261,504)	(- 59,674) (a) 3,070,903 (a) 2,561,894	(- 267,755) 16,012,277 15,829,954	(- 1,983,694) 2,814,465 2,571,359
Switzerland.....	Apr. 19, 1916 Apr. 21, 1911	(- 37,138) 136,613 144,128	..... 848,652 796,909	(+ 509,009) 766,993 646,574	(+ 182,323) 171,635 161,414	(+ 243,106) 544,021 570,226
Netherlands.....	Aug. 1918 June 1913	(- 7,515) 378,294 334,445	(+ 51,743) 1,108,902 1,109,679	(+ 120,419) 939,970 986,920	(+ 10,221) 642,324 842,018	(- 26,205) 600,133 1,350,204
Norway.....	Sept. 1916 Sept. 1910	(+ 43,849) 189,175 167,714	(- 777)	(- 46,950) (a) 1,119,306 (a) 1,133,613	(- 199,694) 1,281,030 1,398,383	(- 750,071) 221,217 333,709
		(+ 21,461) ..... .....	..... ..... .....	(- 14,307)	(- 117,353)	(- 112,492)

Sweden.....	June 1, 1917, Dec. 31, 1913	715,101 596,188	1,775,353 1,843,074	1,245,028 879,572	1,344,202 972,394	1,029,967 977,612
		(+ 118,913)	(- 67,721)	(+ 365,456)	(+ 371,808)	(+ 52,355)
Canada.....	June 30, 1918 June 30, 1914	3,609,257 2,947,738	3,543,600 2,673,286	6,507,267 3,363,531	3,052,748 2,058,045	4,289,682 3,434,261
		(+ 661,519)	(+ 870,314)	(+ 3,143,736)	(+ 994,703)	(+ 855,421)
United States.....	Jan. 1, 1919 Jan. 1, 1914	21,534,000 20,962,000	23,467,000 20,737,000	44,339,000 35,855,000	49,863,000 49,719,000	75,587,000 58,933,000
		(+ 572,000)	(+ 2,730,000)	(+ 8,484,000)	(+ 144,000)	(+ 16,654,000)
New Zealand.....	Jan. 31, 1918 Apr. 1, 1911	378,991 404,284	797,569 804,078	2,090,645 1,216,093	26,538,302 23,996,126	258,269 348,754
		(- 25,293)	(- 6,509)	(+ 874,552)	(+ 2,542,176)	(- 90,485)
South Africa.....	1913 1911	714,414		(a) 5,796,949	35,710,843 33,473,410	
					(+ 2,237,433)	
Australia.....	1915 1913	2,378,514 2,521,983		9,931,345 11,483,882	69,244,603 85,057,402	752,961 800,505
		(- 143,469)		(- 1,552,537)	(- 15,812,799)	(- 47,544)
Brazil.....	1916 1912	6,065,230 7,289,690		(a) 28,962,180 (a) 30,705,400	7,204,920 10,549,930	17,329,210 18,400,530
		(- 1,224,460)		(- 1,743,220)	(- 3,345,010)	(- 1,071,320)
Uruguay.....	1916 1908			(a) 7,802,442 (a) 8,192,602	11,482,251 26,286,296	180,099
				(- 390,160)	(- 14,804,045)	
Italy.....	1914 1908	2,235,000 955,878		(a) 6,646,000 (a) 6,198,861	13,824,000 11,162,926	2,722,000 2,507,798
		(+ 1,279,122)		(+ 447,139)	(+ 2,661,074)	(+ 214,202)

TABLE A

Countries	Date of enumeration	Horses	Milch cows	Other cattle	Sheep	Pigs
Argentina.....	Dec. 31, 1913 Census 1908	9,366,455 7,537,314	.....	(a) 30,796,447 (a) 29,124,336	81,485,149 67,383,962	3,197,337 1,404,269
British India.	1914-15 1912-13	(+ 1,829,141) 1,653,379 1,554,830	..... 37,481,273 35,711,694	(+ 1,672,111) 48,644,710 47,022,902	(+14,101,187) 23,015,836 22,934,265	(+ 1,793,068)
Chili.	1915-16 1913-14	(+ 98,549) 442,642 457,845	(+ 1,769,579)	(+ 1,621,808) (a) 1,869,053 (a) 1,968,620	(+ 81,571) 4,557,800 4,602,317	..... 258,025 221,384
Tunis.....	Apr. 30, 1916 Dec. 30, 1913	(- 15,203) 30,963 37,416	..... 86,376	(- 99,567) 153,613 (a) 217,304	(- 44,517) 1,147,910 (a) 728,540	(+ 36,641) 10,252 17,399
Egypt.....	1916 1913	(- 6,453) 34,403 47,911	..... ..... .....	(- 63,691) (a) 492,650 (a) 637,098	(+ 419,370) 687,696	(- 7,147) 8,580
Russia-in-Europe (47 governments).....	1916 1914	(- 13,508) 23,007,539 20,600,608	..... ..... .....	(- 144,448) (a) 37,562,954 (a) 28,926,122	..... 59,950,742 37,691,318	..... 16,299,508 12,132,524
Germany.....	Dec. 1, 1915 Dec. 2, 1912	(+ 2,406,931) 3,341,627 4,523,059	..... 10,970,009 10,944,283	(+ 8,636,832) 9,376,939 9,237,738	(+22,259,424) 5,073,478 5,803,446	(+ 4,166,984) 17,287,211 21,923,707
		(- 1,181,432)	(+ 25,726)	(+ 139,201)	(- 729,968)	(- 4,636,496)

(a) All cattle.

(b) 1917 for Scotland.

NOTE—This table may be compared with the tables published in the GAZETTE for February 1918, p. 213.

The preceding table does not offer a basis for comparison for South Africa, Italy, Argentina, Russia and Germany which also appear there.

Putting aside the figures for these countries we find for the other countries the following total increases, decreases and net differences:—

	Increases	Decreases	Net Increase or Decrease
Horses	1,805,125	2,469,184	— 664,059
Cattle	20,614,287	6,721,241	+ 13,893,046
Sheep	4,746,172	41,056,543	— 36,310,371
Pigs	17,841,523	8,055,268	+ 9,786,255

We find therefore, in the chief countries that have been during the war open to commerce, a rather marked increase in the number of cattle and pigs, and a marked decrease in the number of sheep. The figures for Argentine, however, are not known: we only observe that between 1908 and 1913 they increased their sheep by 14 million head. They have just had two abundant harvests following a bad drought and failure of crops. When the census, which was taken in 1917, becomes known, it does not seem probable that it will show any great increase over the figures for 1913. Taking into account the figures in the preceding table that afford some basis for comparison, there is such a shortage of sheep in the world as to encourage Canadian breeders to increase their production. There is no doubt that there will eventually develop a considerable demand for all classes of live stock when with adequate shipping there is free commercial intercourse with the Central and East Mediterranean countries.

No statistics have been received since the war from these countries, nor from Italy. There is a consensus of opinion that the live stock of all these countries, except Italy, suffered very severely, probably much more severely than France, where the live stock were spared to the extent of France's imports from the Allies and the neutrals. For the purpose of establishing a minimum of the de-

creases incurred as compared with ascertained pre-war data, the following estimates have been based on the ascertained data for France in the corresponding years mentioned, applying for each class of stock the percentage of decrease shown for France.

Leaving aside Russia, which will be referred to later, there appears therefore a world shortage of 3,468,059 horses, 49,516,371 sheep and 6,254,745 pigs; and a world surplus of 7,099,046 cattle. The figures in Table "C" are estimated minimum figures. The vague scattered information that has leaked out seems to forecast much larger decreases.

There are no data for Russia-in-Asia. For Russia-in-Europe we have inserted in Table "A" the official data for 1916 forwarded to the Institute by the Russian Government, but such phenomenal increases as indicated seem improbable. The only explanation for the increase is the possibility that large numbers of live-stock were driven into Russia from the invaded territories about the time the official enumeration was carried out. These were probably much more than absorbed by the Germans and Austrians when they subsequently overran the best stocked Russian territory and eagerly commandeered all stock in sight. There has been no incentive for further breeding in Russia and probably the depletion has become quite marked as compared with pre-war figures.

Countries	Date	Horses	Cattle	Sheep	Pigs
Austria.....	1917 Dec. 1910	1,280,000 1,803,000	7,690,000 9,160,000	1,602,000 2,428,000	3,860,000 6,432,000
		(- 523,000)	(- 1,470,000)	(- 826,000)	(- 2,572,000)
Hungary	1917 April 1913	1,425,000 2,005,000	5,075,000 6,045,000	4,330,000 6,560,000	4,095,000 6,825,000
		(- 580,000)	(- 970,000)	(- 2,230,000)	(- 2,730,000)
Belgium.	1917 Dec. 1913	190,000 267,000	1,540,000 1,849,000	. . . . .	850,000 1,412,000
		(- 77,000)	(- 309,000)	. . . . .	(- 562,000)
Bulgaria.	1917 Dec. 1910	340,000 478,000	1,350,000 1,603,000	5,700,000 8,632,000	320,000 527,000
		(- 138,000)	(- 253,000)	(- 2,932,000)	(- 207,000)
Roumania.. . . .	1917 1911	585,000 825,000	2,240,000 2,667,000	3,480,000 5,269,000	610,000 1,021,000
		(- 240,000)	(- 427,000)	(- 1,789,000)	(- 411,000)
Germany.	1917 Dec. 1912	3,210,000 4,523,000	16,950,000 20,182,000	3,830,000 5,803,000	13,154,000 21,924,000
		(- 1,313,000)	(- 3,232,000)	(- 1,973,000)	(- 8,770,000)
Italy....	1917 1914	2,302,000 2,235,000	6,513,000 6,646,000	10,368,000 13,824,000	1,933,000 2,722,000
		(+ 67,000)	(- 133,000)	(- 3,456,000)	(- 789,000)
Total Decreases.		-2,804,000	- 6,794,000	- 13,206,000	- 16,041,000
Total differences in table B.		- 664,059	+13,893,046	- 36,310,371	+ 9,786,255
Total net results.		-3,468,059	+ 7,099,046	- 49,516,371	- 6,254,745

In a subsequent issue of the "Agricultural Gazette" the subject of the world's live stock will be dealt with

further, especially with reference to its movements to the various markets.

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DOMINION OF CANADA
DEPARTMENT OF AGRICULTURE

The Agricultural Gazette of Canada

EDITOR: J. B. SPENCER, B.S.A.

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GOOD SEED

“**A**S ye sow so shall ye reap.” Never before in the history of agriculture has this declaration been so keenly appreciated as now. Good seed and of proved variety is the desire of every intelligent husbandman. At no previous time has dependable seed been so readily available. Plant breeders have never slackened their efforts to produce something better; experimenters are constantly eliminating the unworthy, and organizations and individuals are diligent in creating new and better methods of production and distribution. The federal and provincial departments of agriculture co-operate in this work.

New varieties of field crops are tested and proved or bred by plant breeding experts on the federal and provincial experiment stations. Farmers who make a specialty of seed grown under the direction of the Canadian Seed Growers' Association obtain their stock seed from these experiment stations and multiply and sell it as inspected registered seed. To further extend this work the Seed Branch of the federal Department of Agriculture expends fifty thousand dollars a year on condition that the provinces expend a similar amount in organizing and conducting competitions in field crops which are judged from the standpoint of utility for seed purposes. The general plans for these field crop competitions are prescribed by the Minister of Agriculture for Canada. For the holding of local seed fairs the federal Seed Branch shares the cost with the provincial departments of agriculture. These fairs are very helpful in the distribution of good seed grain within the locality in which each is held. Substantial grants are also given by the Seed Branch for the provincial seed exhibitions at which prize winning exhibits in field crop competitions and seed fairs receive further attention as do also exhibits of registered seed.

The above organizations that have been brought into existence by the federal Department of Agriculture have been found to provide an efficient connecting link between the plant breeders of Canada and the farmers on the back concessions who are now, as a result, producing crops from seed of better quality than did the more favourably situated farmers of twenty or even ten years ago. In addition, there is now much opportunity for individual

effort. And yet after so much has been done, seed shortages occur, yes, and for the ordinary cereal crops of Canada. Seed shortage is, however, a relative term. Before the days of the seed testing laboratory, seed shortages were not felt and many a poor stand was charged to a blight, an insect, or some other mysterious cause. The light is entering, and those who would reap are not satisfied to take chances with uncertain seed. The war has accentuated this appreciation and humanity is benefited.

In this issue of THE AGRICULTURAL GAZETTE all the older provinces are shown to be almost if not quite self-supporting in the matter of cereal seed. The assistance afforded by the seed fair in some of the provinces is also brought out. The Seed Purchasing Commission is taking care of the demand for seed oats in the Prairie Provinces by making available tested supplies at market values and banks are encouraged to provide funds for legitimate seed purchasing. The question naturally arises, when will farmers' organizations be able to

provide within themselves the great annual seed needs?

Professor John Bracken of Saskatchewan University has proposed a plan that calls upon the agricultural society to co-operate with the plant breeding station by the station each year providing elite stock seed of each main cereal crop to sow twenty acres in the district of each agricultural society, on the farm of a selected member. Each twenty acres of crop produced from this seed the first year would require to be officially inspected. The plan provides further that in the second year ten selected farmers in each society would sow the seed produced from the twenty acres of pedigreed seed. By this plan, an agricultural society would, the second year, produce at least two hundred acres of seed of superior variety grown by ten of the best farmers in its membership. This plan applied to the main cereal crops grown and consistently followed up in any province should reduce the possibility of a seed shortage to a minimum.

ELEMENTARY AGRICULTURAL EDUCATION IN SASKATCHEWAN

PROVINCIAL REGULATIONS FOR THE EMPLOYMENT OF AGRICULTURAL INSTRUCTION ACT APPROPRIATIONS

FROM OFFICE OF AGRICULTURAL INSTRUCTION ACT, OTTAWA.

SPECIFIC regulations have recently been framed by the Agricultural Instruction Committee of the Province of Saskatchewan governing the expenditure of the allotment made annually under the Agricultural Instruction Act to that Province for elementary agricultural education.

The regulations relate to the following expenditures, namely,—

(1) The payment of the salaries of teachers in agriculture and household science in certain schools;

(2) Grants to high schools and collegiate institutes for teaching agriculture and household science including special courses.

(3) The payment of salaries and travelling expenses of persons engaged in extension work in agriculture and household science in the public schools. The purchase of equipment necessary for extension work.

(4) Cost of bulletins, etc., on agriculture and household science.

(5) Expenditure on Summer School for Teachers.

A summary of the regulations under the above headings follows,—

(1) TEACHERS' SALARIES

In each of the provincial Normal Schools the payment is authorized of the salary of a teacher giving whole time to instruction in nature study

and agriculture or to extension work in these subjects; teacher to hold a B.S.A. degree or qualifications regarded as satisfactory by the Department of Education.

The payment is authorized of the salary of a teacher in household science in each of the provincial Normal Schools under similar conditions.

Where a high school or collegiate institute employs a teacher, professionally trained, who holds a B.S.A. degree or a bachelor's degree in household science, or equivalent qualifications, the payment is authorized of two-thirds of the salary paid; the maximum grant to be \$1,500 and \$1,200 respectively.

Where at least two high schools (or three town or village districts in which there is no high school) jointly employ an itinerant teacher, either of agriculture or household science, one-half of the salary of each such teacher is allowed; the maximum grant to be \$900 and \$750 respectively; a valid certificate for Saskatchewan constitutes the qualification.

(2) GRANTS TO HIGH SCHOOLS AND COLLEGIATE INSTITUTES

To a high school or collegiate institute not employing a special instructor as above (or to a school in which a department is devoted exclusively to high school work) a grant of one hundred dollars per annum is authorized for agriculture and household science respectively, provided the instruction is satisfactory to the inspector of high schools. The maximum grant is conditional on the teacher's whole time being given to the subject; otherwise it is proportionate to the amount of time given.

To a high school or collegiate institute making provision for special

instruction in agriculture and household science to boys and girls from rural districts, a grant of \$500 is authorized for the winter session of 1918-19. The conditions are that the length of course is at least three months, that the enrolment is at least fifteen and the monthly average ten, and that the equipment and instruction are satisfactory to the Department. Also that provision is made whereby pupils in the special courses may receive instruction in English, history and civics, arithmetic and farm accounts. Pupils may enter these courses on satisfying the principal as to their general fitness.

(3) EXTENSION WORK

Payment is authorized of the salary and expenses (including equipment) of persons employed by the Department of Education in extension work in agriculture, nature study and household science in the public schools, the work to include assistance to teachers and trustees, boys' and girls' clubs, rural educational associations and other community organisations.

(4) PUBLICATIONS

Payment is authorized of the cost of the publication of periodicals or bulletins for the furtherance of the work of instruction in agriculture and household science.

(5) SUMMER COURSE FOR TEACHERS

Payment is authorized of all necessary expenses incurred in connection with the Summer Course for Teachers, including remuneration of special instructors in agriculture and household science.

PART I

Dominion Department of Agriculture

THE EXPERIMENTAL FARMS

THE DIVISION OF CHEMISTRY

THE MANURIAL VALUE OF BRACKEN

BY FRANK T. SHUTT, M.A., D. SC. DOMINION CHEMIST.

THE common bracken or brake (*Pteris aquilina* L.) is a fern of very wide distribution and in certain parts of Canada and more particularly on the Pacific coast, British Columbia, it grows most luxuriantly. The officer in charge of the Experimental Farm at Agassiz, situated in the Fraser Valley, B.C., to whom we had written in the matter, says in a letter dated June 26, 1918.

"Bracken grows most profusely in this district on logged-off or burned-over land. On this kind of land the labour entailed in harvesting it would be considerable, as most of the work would have to be done with a scythe and labour at present is very scarce and high-priced. The plant may be found in patches of almost all sizes throughout the Fraser valley. I would say that the approximate tonnage per acre would be two tons, after the plant had been cured."

In 1903 we first directed attention to the manurial value of bracken, used as a litter or as rotted in the compost heap with manure. It is particularly as a bedding material that the fern, in the air-dried condition, can be employed to advantage, since it possesses a well marked absorptive capacity for liquids and ammonia. When thus used the subsequent fermentation in the manure pile rots the fern and sets free its plant food, which as will be seen by the analyses, is present in notable quantities. Manure made with

bracken as a litter is fully equal to that from straw and is more particularly useful on heavy clay loams from the fact that it takes somewhat longer to rot in the soil and thus acts opening up the soil and improving its tilth. Our analysis at that date (1903), obtained on a sample of the air-dried fern sent from Loch Errock, B.C., afforded the following data:—

	Percent	Pounds per Ton
Mineral matter or ash.....	6.78	135.6
Nitrogen	1.29	25.8
Phosphoric acid.....	0.43	8.6
Potash.....	1.52	30.4

Last June (1918) a sample forwarded by the officer in charge of the Experimental Farm, Agassiz, B.C., was submitted to analysis. The plant at the time of cutting was about 6 feet high, consisting approximately of 3 feet of bare stalk and 3 feet of leafy frond. The data are as follows:—

Analysis of air-dried bracken

	Stalk p.c.	Leaf p.c.	Whole plant	
			per- cent	pounds per ton
Moisture.....	6.25	5.99	6.09	.....
Ash.....	6.35	8.79	7.84	156.8
Nitrogen.....	0.85	2.45	1.84	36.8
Phosphoric acid	0.7	0.81	0.68	13.6
Potash.....	2.81	2.72	2.75	55.0

Analyses made in England indicate that the ash of very young bracken contains over 50 per cent potash; that of the fully grown fern from 30 per cent. to 40 per cent. However, owing to the larger yield, the fully grown plant will furnish more potash per acre than the fern cut in the earlier stages of growth.

Since in many localities bracken may be obtained at the cost of cutting and hauling, it is evident that its harvesting and use, especially in seasons when straw is scarce, may be advantageous. Its notable percentages of potash and nitrogen, not to speak of its other fertilizing elements and its organic matter content, give it a manurial value of no mean order.

Bracken may be cut, dried and stored in the autumn, but if climatic conditions permit it might be cut throughout the winter. In connection with the harvesting, it should be noted that dried bracken rapidly loses its potash on exposure to rainy weather, and that left out all winter is found to be very poor in that element.

Recent investigatory work carried out by the Pathologist of the Health of Animals Branch, Department of Agriculture, has shown that dried bracken as present in poor hays may act as a poison to horses.*

It is, however, well established that no animal will readily eat either green or dry bracken; indeed it is only under conditions which practically preclude all other food that they can be induced to take it. Further, it has been shown that small amounts may be eaten with impunity and this is especially true as regards cattle. We therefore are of the opinion that while the use of ferny hay is to be deprecated, the employment of dried bracken as a bedding material for cows and swine, on farms where the live stock is rationally and generously fed, is a perfectly safe practice.

On farms which cannot use bracken as a litter, or if this employment of it is objected to, the green material may be composted with manure. Or the cured form may be burnt and the ash preserved, but in this case, of course, the organic matter and the nitrogen are necessarily lost.

*The Poisoning of Horses by the Common Bracken, by S. Hadwen, D.V.S. and E. A. Bruce, V.S., Bulletin No. 26, Scientific Series. Health of Animals Branch, Department of Agriculture.

DIVISION OF FORAGE PLANTS

SUGAR CONTENT AND ITS RELATION TO WINTER-HARDINESS

BY M. O. MALTE, PH. D., DOMINION AGROSTOLOGIST

INVESTIGATIONS have been carried on in Sweden for the purpose of determining whether there exists any relation between cold resistance and sugar content in winter wheat varieties. The results, though not final, are sufficiently significant to interest Canadian plant breeders.

The results of the investigations indicated that, although both the dry-matter content and the sugar content were found to vary considerably with the temperature, there seemed to exist a distinct relation between sugar content and winter-hardiness, as varieties characterized

by a higher degree of winter-hardiness always were found to carry a higher percentage of sugar than varieties characterized by a lower degree of winter-hardiness.

The investigations were continued during the winter of 1917-18 by A. Akerman, Hj. Johansson and B. Platon. In the following a brief synopsis of the results, as published in "Sveriges Utsadesforenings Tidskrift, 1918, pp. 216-224," will be given.

The varieties used in the investigations were "Sammetsvete" (Velvet Wheat) which is a distinctly winter-hardy variety, "Solvete 11" (Sun Wheat 11), a hardy variety origi-

nated from a cross between "Sun Wheat" 1 and "Extra Square-head 11," "Tystofte Smaahvede 11" (Tystofte Small Wheat 11), a Danish variety lacking in winter-hardiness, and "Wilhelmina Wheat", a Dutch variety even less hardy.

These varieties were grown together under as uniform conditions as possible, and special stress was laid upon the taking of ideally uniform samples for the chemical analyses and on the uniform treatment of the samples taken so as to ensure least possible errors in the determination of the "sugar content". The term "sugar" is used for convenience sake to designate the reducing substances in the cells, although it is probable that reducing substances other than sugar may have to be reckoned with. Whenever samples were taken for

analysis on sugar content, analyses were also made for the determination of the presence of starch, but in the period during which the sugar analyses were made, no trace of starch could be found in the cells, not even in the cells of the stomata.

Samples of the varieties mentioned were taken for analysis on dry-matter and sugar content on eight dates, the first ones being taken on Nov. 12, 1917, and the last on Febr. 15, 1918, and the figures obtained represent averages of from five to ten analyses on each sample taken. For the sake of making clear the relation existing between winter-hardiness and sugar content the following table, compiled from the results as published in the Journal of the Swedish Seed Association, is hereby presented.

Sugar Content in Winter-Wheat Varieties in per cent of the dry-matter.

Samples taken	Velvet Wheat	Sun Wheat 11	Tystofte Small Wheat 11	Wilhelmina Wheat
Nov. 12, '17.....	14.8	10.7	8.0	8.5
27, '17.....	12.8	8.7	5.1	5.1
Dec. 28, '17.....	10.4	5.7	4.5	3.2
Jan. 4, '18.....	12.2	6.6	5.8	4.8
6, '18.....	12.8	8.1	7.5	5.5
18, '18.....	9.7	5.8	4.9	4.6
24, '18.....	19.8 ¹	14.0	10.1	10.6
Feb. 15, '18.....	19.2	17.5	14.4	16.6

¹ Sugar content probably too high on account of error in weighing.

It is clear from the above table that during the middle of the winter which, according to observations made, is the most critical period in so far as the killing influence of the cold proper on wheat varieties is concerned, the sugar content is by far the highest in the Velvet Wheat. It is lower in the Sun Wheat 11, still lower in the Tystofte Small Wheat 11, and lowest in the Wilhelmina Wheat. As actual observations on the cold resistance of the varieties in question have demonstrated that the Velvet Wheat is the most hardy variety, with Sun Wheat 11 coming second, Tystofte Small Wheat 11 third, and Wilhelmina

Wheat fourth, there seems to be very good reasons, indeed, to conclude that there exists a direct relationship between winter hardiness and sugar content in the varieties of wheat mentioned, the hardest variety having the highest sugar content and, generally speaking, the higher the sugar content, the harder the variety.

It is likely that if there exists a direct relationship between hardiness and sugar content in wheat, the same may be found to be true of other agricultural plants, including fruit trees, berry bushes, clovers, alfalfa, grasses, and cereals in general. What bearing such a relationship, if found general in plants, may have on the under-

standing and interpretation of phenomena relative to winter-killing, can not be fathomed at the present stage of our knowledge but, notwithstanding the fact that the data so far available are somewhat lacking in convincing power there should be in the investigations referred to, sufficient stimulance to warrant thorough investigations on the subject of winter-hardiness of plants by all Canadian institutions interested in the agricultural development of the country. The more so as the subject through the investigations by the Swedish scientists has been placed on a foundation resting on a measurable physiologico-chemical and physico-chemical basis. Truly, there are some discrepancies and some unexplained incongruities in the records published which need further elucidation, principally physiologico-chemical and which probably will be cleared up by further observations and records of a more minute nature but, just the same, the results so far recorded should commend themselves to the interest of all Canadian plant breeders and agriculturists because they have a

direct bearing on the crop increasing possibilities in the Dominion.

The mere fact that cold resistance has been proven to be measurable by physiologico-chemical methods, together with the fact that, according to probably the foremost European representative of Mendelism at the present time, *Dr. H. Nilsson-Ehle*, cold resistance behaves like a Mendelian character or, perhaps, rather as a complicated one, opens up a new field of investigations of particular interest to Canada. It is too early yet to venture any prediction of the possibilities in the increase of crop production which might result from future work along the lines of winter-hardiness as based on chemical analysis but, notwithstanding the guarded and strikingly modest opinion expressed by the Swedish investigators, the writer is inclined to think that the correlation between winter-hardiness and sugar content, if found general, will prove of an agricultural importance to Canada which, if facilities for physiologico-chemical investigations are afforded, might prove of extremely great importance.

NOTE.—This article is summarized from "Svenskes Utsädesforenigns Tidskrift" (Journal of the Swedish Seed Association), 1918, A. Akerman, H. Johansson, and B. Platon.

THE DIVISION OF HORTICULTURE

VARIETIES OF POTATOES RESISTANT TO LATE BLIGHT OR ROT

BY W. T. MACOUN, DOMINION HORTICULTURIST

DURING the past thirty years nearly eight hundred varieties of potatoes have been grown at the Central Experimental Farm, Ottawa. Seedlings have also been raised, from which blight-resistant varieties might be selected. In the early years the number of varieties grown each year was very large but gradually the poorest yielding sorts, those which were poorest in quality and those most subject to late blight, were discarded. Beginning in 1905 the varieties, of which the plants were least affected by blight, were kept separate from the others and not sprayed with Bordeaux mixture.

Fifty-three varieties were eventually brought together in this way as apparently most resistant to blight. Of these fifty-three, however, there were ten which were more outstanding than the others, the majority having been rather badly affected in years when the blight was severe. These then varieties were: King Edward, Dalmeny Beauty, Factor, Hard to Beat, Highlander, Duchess of Cornwall, White Giant, Dr. Maerker, Sirdar, Holborn Abundance. Of these, all but the White Giant were British or European varieties where special attention has been paid to blight-resistant sorts.

For various reasons all of these varieties have been discontinued except the Factor and the Holborn Abundance; the latter variety, however, is not grown at the Central Farm but at one of the Branch Stations. It is rather rough in appearance for a good commercial variety.

Before the Act went into force, which prohibited the importation of potatoes into Canada, a large number of other varieties including some of the most blight-resistant originated in Great Britain were imported, and among these the Dalmeny Regent, Dalmeny Hero, Table Talk and Brydon are among the most promising in this respect. The drawback to many British varieties said to be most resistant is that they are not

productive enough when grown in Canada.

Both the Dakota Red and Maggie Murphy potatoes have withstood blight better than most in some places and have become very popular on this account, but they are inferior in quality and are not always immune.

In conclusion it may be said that the most blight-resistant varieties are mainly among the latest sorts, and the latest sorts are in many districts where the potatoes are grown, rather poor in quality. Much attention has been given to blight-resistant varieties by the Department of Agriculture of the United States both by breeding and otherwise, but, as in Canada, severe late blight only occurs occasionally and it takes a long time to get definite results.

***“The Cultivation of the land is the basis of
National Strength and Prosperity”***

—Mr. David Lloyd George at Manchester, England,
12 September, 1918.

THE ENTOMOLOGICAL BRANCH

THE POPLAR BORER (*Saperda calcarata* Say)

BY R. N. CHRYSTAL, FIELD OFFICER

DURING the past summer on a ranch near Cowley, in the foothills of southern Alberta, the writer observed, and had some opportunity of examining, serious damage to cottonwoods by the trees being already dead and others in a dying condition. The extent of the damage seemed to warrant an inquiry being made, inasmuch as the continued loss of trees upon the area would certainly be serious from the



POPLAR INJURED BY *Saperda calcarata* Say

adults and grubs of the Poplar Borer, *Saperda calcarata* Say.

The damage was noticed in a small area of cottonwoods on a hill behind the ranch house, a large number of

point of view of such protection from high winds as they might be able to afford.

This insect which was definitely ascertained to be entirely responsible

for the death of the trees, is a boring beetle belonging to the coleopterous family cerambycidae, which contains many destructive enemies of forest and shade trees.

HISTORICAL

This beetle has been reported from many parts of the United States as a serious pest of several species of poplar.

Harris writing in 1862 described serious injury to Lombardy and American poplars. In 1884 Packard wrote of serious damage to poplars along the shores of Casco Bay, Maine. C. V. Riley, refers to the insect as being universally destructive to cottonwoods and poplars in the Western States; and in 1893 Bruner, in writing of the insect, considers it by far the most destructive enemy to poplars and cottonwoods in the Western States, adding that it is practically impossible to obtain trees of any size in the cities and towns of Nebraska, where the friendly care of parasitic enemies and predatory birds is absent. In Canada the insect has been reported all across the continent from Nova Scotia to Vancouver Island. In a recent article in the Journal of Economic Entomology, Vol. V, August, 1912, Mr. Wilson P. Gee reports the destruction of 1200-1400 handsome Carolina Poplars (*P. deltoides* Mbrsh) by this insect at Whitmire, S. Carolina, the damage only being discovered after several of the affected trees had been so badly weakened that the wind broke them down at a point seven to nine feet above the ground.

DESCRIPTION

The Adult.—This species is the largest of the genus occurring in this country; length $\frac{3}{4}$ to $1\frac{1}{4}$ inch. The entire body and its appendages are covered with a close nap of fine gray hairs, relieved by patches or lines of yellow; upper surface with numerous small dark punctures showing through the pubescence. The

head has the mouth parts black, excepting the ligula which is membranous; the eyes kidney shaped, black and shining, partly encircling the base of the antennae; the antennae eleven-segmented, the second segment exceedingly short, about one quarter of the length of the third; the yellow markings consist of two submedian bands and a yellow band round the eyes.



LARVAL MINES AND PUPAL CELLS OF
Saperda calcarata Say

The thorax is rectangular, slightly broader than long with three yellow longitudinal bands.

The elytra taper slightly towards the apex, each elytron ending in a

sutural spine; the scutellum yellow; the yellow markings on each elytron, a lateral band of varying length, and from 5 to 7 irregular spots or lines on the disc; the punctuation becoming sparser towards the apex, the individual punctures, however, being very uniform in size. Legs unicolorous, hairy. Ventral surface closely pubescent, gray; punctures very shallow; yellow markings not so distinct as upon the dorsal surface.

Secondary Sexual Characters.—The antennae of the female are shorter than the body; in the male they are longer. The outer claw of the front and middle tarsi of the male may be either simple, or have a large basal tooth or obtuse process.* A further point of difference between the sexes may be seen by comparison of the frontal region. The distance between the eyes in the female is almost one-third greater than in the male. The outline of the eyes as seen from the front is decidedly angular in the female, while in the male it is more rounded. The front between the eyes in the female is almost flat, while in the male there is a distinct median depression decidedly emarginate in outline. The distance from the front margin of the eyes to the margin of the front is nearly twice as great in the female, as in the male.

The Larva.—The full grown larva is about 2 inches long, yellowish in colour, legless, body tapering slightly posteriorly, the last segment being decidedly narrower than the preceding ones. Head retracted into the first segment of the thorax; the mouth parts dark brown to black; mandibles very powerful; the body composed of the head, followed by 13 segments, 3 thoracic and 10 abdominal; elongate-oval, brownish spiracles present on the sides of the first thoracic and first eight abdominal segments; pleural folds present, on all the abdominal segments. The first thoracic segment is larger and more heavily chitinized than the others. On the upper and lower

surfaces of the three thoracic segments and abdominal segments 1-7 there are wide roughened areas which serve the purpose of legs. These are more prominent on the dorsal surface of the first thoracic segment than on the succeeding segments. Examined in detail they show as chitinized ridges which gradually decrease in size until at the base of the segment they become sharp pointed spikes,



SCARS ON BACK OF
POPLAR, CAUSED BY
Saperda calcarata Say

retaining this character throughout the remaining segments.

LIFE HISTORY

The adult beetles may be found on the trunks and branches of the poplars during August and September; pairing was observed at Cowley,

*Leng and Hamilton—"Synopsis of the Lamiinae. Ann. Amer. Ent. Soc. 7, 23, p. 147.

Alberta, on August 11, 1918. The eggs are laid in crevices of the bark, and the young grubs feed for a short time between the inner bark and outer sapwood, beginning to tunnel deeper into the wood on the approach of cold weather. The life-cycle probably requires three years for its completion, large irregular galleries being excavated in the heart wood during this period.

The pupal stage is passed near the centre of the trunk or branch, in a specially constructed pupal cell of which the top is smoothly excavated and the opposite end closely packed with wood fibres, the portion nearest the pupa being coated with fine sawdust. The pupal stage lasts several weeks.

DAMAGE

The outward evidences of the presence of the insect are two in number: first, scars on the trunk and branches of the trees, black, and swollen in some cases, but quite as often exuding a quantity of sap, such spots being an attraction for butterflies, wasps, bees and other insects; and secondly, from the open ends of the tunnels large amount of sawdust and excelsior like shavings are to be found scattered upon the ground below. This condition may be seen in early summer. These indications, coupled with apparent signs of the unhealthy condition of the tree, such as dead branches, wilting leaves, etc., will provide a safe basis for identifying damage by this borer, and would certainly bear much closer investigation.

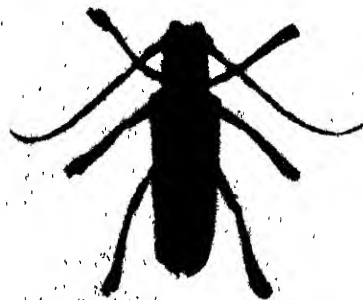
REMEDIAL MEASURES.

In dealing with outbreaks of this beetle *on a large scale*, the only practical method consists in cutting out and burning more than 75 per cent of the worst affected trees on the area, such trees being picked out by the presence of the indications stated above. The work of cutting out the infested trees could be done

in winter time and the wood used for fuel. Dead trees are not a direct menace, but should be removed if possible, as being the breeding ground for other harmful wood boring species.

If the work is not finished during the winter, it should be completed before the month of July to ensure the destruction of the pupae and adults.

Where the protection of valuable ornamental trees in parks and gardens is required, more detailed measures may be recommended. The first of these which may be mentioned is the application of repellant washes to the bark to prevent oviposition; several formulae have been given as being suitable for such a wash of



Saperda Calcarata SAY, ADULT

which the following seems to be the best:

"In six gallons of saturated solution of washing soda dissolve one gallon of soft soap, add one pint of carbolic acid, mix thoroughly; slack enough lime in four gallons of water, so that when added a thick whitewash will result, then add one-half pound of Paris green, mix thoroughly."

As a means of destroying the young larvae, when they are burrowing in the cambium region, mechanical means may be tried. A sharp knife may be used if it is possible to dig the larvae out; or if they are too far in for this a hooked piece of wire inserted into the tunnel may locate the occupant. Should the tunnel be too crooked, however, to admit of

this operation being conducted with success, carbon bisulphide may be used in the following manner:

A very small amount of the bisulphide is sprayed into the burrows by means of an atomizer, which causes more complete and satisfactory diffusion of the poisonous fumes. All entrance holes are at once tightly sealed with putty.

The employment of a caustic wash

such as kerosene emulsion to destroy the young larvae at this stage has been recommended by some writers. This method has proved successful in the case of the Locust borer *Cyllene robiniae* Forst; but so far as known to the writer, no published data of experiments on the control of this species by such a means are yet available.

THE SEED BRANCH

GERMINATION OF OATS EXPOSED TO VARYING DEGREES OF FROST AT DIFFERENT STAGES OF MATURITY

BY J. R. FRYER, M.A., SEED LABORATORY, CALGARY

IT is commonly believed and taught by agricultural authorities that one or two degrees of frost occurring while oats are in the milk stage is sufficient to ruin them for seed. This belief seems to have been handed from one to another without question, and so far as the writer is aware, without the basis of accurate and definite observations. Moreover grain experts seem to be under the impression that frost effects in oats exhibit themselves physically by a darkened appearance and a brittle texture of the interior of the kernel. This is undoubtedly true but it has been frequently observed that kernels with badly discoloured interiors show good vitality when subjected to germination test, and on the other hand kernels quite free from such supposed frost injury fail to give good germination even when causes of low vitality other than frost are believed to have been non-existent.

There seemingly exists in Canada to-day no exact information based on accurate observations as to the degree of frost at various stages of maturity necessary to injure the vitality of oats, and as to the precise physical effects of frost on maturing kernels. As information of this kind is urgently needed in this country where large acreages of oats are annually subject

to early fall frosts, the Dominion Seed Branch a year ago decided to endeavour to record some careful observations in this connection, with the result that during the summer and fall of 1918, a beginning was made. In conducting this investigation, the Dominion Experimental Farms Branch officials at Lacombe and Lethbridge very kindly gave their advice and co-operation. On each of the Experimental Farms at these places, plots of one-thirtieth of an acre were sown with registered Banner oats at intervals of one week during the latter part of the oat seeding season and some time later, making 9 plots at Lacombe and 8 at Lethbridge. These plots were sown in series in order that when frosts should occur in the fall, the different plots would be in different stages of maturity, and it would then be possible to secure samples in different stages which had been exposed to the same frost. The plots at each farm were designated A, B, C, D, etc., in the order of sowing. Commencing August 1 and extending to October 22, daily weather records were made at both farms, covering the maximum and minimum temperatures, hygrometric conditions, rainfall and sunshine, and at Lacombe, the daily rate of evaporation was also

recorded. At Lacombe the weather recording instruments were placed in the field among the plots so that records would be as true as possible for the weather conditions to which the maturing plots were exposed.

During the above-mentioned period samples were taken at Lethbridge from the different plots at intervals of one week, while at Lacombe three samples per week were taken from each plot. At the time of taking samples observation of the stages of maturity were recorded for all plots. At Lethbridge 66 samples were taken and at Lacombe 230 samples were secured, all of which were air-dried for a few days after taking to insure against heating while in storage. In the months of November and December all samples were tested for germination in the seed laboratory at Calgary. At Lacombe the moisture content of kernels from each sample for alternate plots as well as the soil moisture were determined.

Briefly, an effort was made to secure records of weather conditions

to which the plots were exposed during the maturing period and to take a series of samples from each plot during that period, for purposes of examination and germination test, so that any peculiarities of vitality or other features of the samples might be accounted for from the weather record.

It is not within the scope of this article to give complete results of last season's work in connection with this investigation. Consequently, what follows will refer only to work done at the Lacombe Experimental Station and will include only germination results on a few samples at different stages of maturity, taken immediately before and after frosts. By comparing the germination results for samples taken before and after frosts of known severity some idea may be had of the effects of those frosts on oats at the different stages of maturity at the time of the frosts.

The following tables will enable this comparison to be made.

FROST OF AUGUST 31—SEPTEMBER 1 OF 2.3° OF FROST.

<i>Samples taken Aug. 31, before frost</i>			<i>Samples taken Sept. 3, after frost</i>		
Plots and Stages	Germination		Plots and Stages	Germination	
	6 days	12 days		6 days	12 days
C. Milk—early dough.....	93	94	C. Milk—dough.....	90	91
D. Creamy—late dough ..	97	97	D. Creamy—mealy.....	99	99
F. Water—milk ..	78	78	F. Water—milk.....	89	89
G. Water—milk.....	80	81	G. Water—milk.....	89	91

FROST OF SEPTEMBER 13-14 4.6° OF FROST ACCOMPANIED BY HEAVY DEW.

<i>Samples taken Sept. 12, before frost</i>			<i>Samples taken Sept. 14, after frost</i>		
Plots and Stages	Germination		Plots and Stages	Germination	
	6 days	12 days		6 days	12 days
C. Creamy to dough.....	95	95	C. Creamy—dough.....	95	96
D. Early dough—mealy...	98	99	D. Dough—mealy.....	98	98
E. Early milk—early dough	94	94	E. Creamy—dough.....	95	96
F. Milk—early dough.....	96	96	F. Milk—early dough....	94	95
G. Milk—early dough.....	93	94	G. Milk—early dough....	94	94

FROSTS OF OCTOBER 6-7 of 5° and OCT. 7-8 of 8°

<i>Samples taken Oct. 5, before frosts</i>			<i>Samples taken Oct. 8, after frosts</i>		
Plots and Stages	Germination		Plots and Stages	Germination	
	6 days	12 days		6 days	12 days
C. Dry and mealy.....	93	94	C. Dry and mealy.	91	94
D. Dry and mealy.....	99	99	D. Dry and mealy	99	99
F. Dough—mealy.....	93	94	F. Dough—mealy	90	96
G. Soft dough—mealy....	96	96	G. Dough—mealy....	71	87
H. Milk—creamy.....	91	92	H. Milk—dough.....	34	61
I. Milk	66	76	I. Milk—creamy	13	45

From an examination of the first table it will be observed that the frost of 2·3° did not reduce the percentage vitality of those samples in stages ranging from water to dough. The second table indicates that 4·6° of frost accompanied by a heavy deposition of dew did not lower the percentage of vitality of samples ranging in stages from milk to mealy. In the third table, samples ranging from dough to dry mealy stages were apparently not injured in vitality by 5° and 8° of frost on consecutive nights, while those ranging from the milk to dough stages were evidently considerably reduced in percentage

germination as a result of these frosts. This is particularly noticeable in the six-day percentage of germination, which may be regarded as an indication of the germination energy of the samples.

The work done last season in connection with this investigation is very limited and preliminary, and any generalizations from results so far obtained would be quite unjustifiable. Many more observations will have to be made before it can be definitely stated what degree of frost is necessary to devitalize oats at different stages of maturity.

The consolidated school lends itself to the advancement of agricultural education to a greater degree than does the ordinary rural school. In fact it is difficult to see how much substantial progress can be made in agricultural education in rural schools as they are at present constituted. With so many subjects to cover the teachers cannot specialize in agricultural teaching but to a limited extent. In a consolidated school where there are several teachers it would be possible to have one specially trained to teach agriculture.

Canadian Farm.

PART II

Provincial Departments of Agriculture

THE POTATO

During the period of the war the potato assumed a position of importance not previously recognized. The governments of many countries and provinces have given special study not only to the development of superior varieties but also to the study and control of diseases and means of encouraging an extensive trade. In the March number an account of the inspection service conducted by the Federal Department of Agriculture and of potato disease investigations carried on by the Ontario Department of Agriculture were described. The following articles deal with the work of the Ontario Department of Agriculture in developing a potato seed trade in Northern Ontario, with the work that is being accomplished by the Northern Ontario Plant Breeding Station, the Manitoba Agricultural College and by British Columbia, to develop healthy stock.

ONTARIO

THE NORTHERN ONTARIO SEED POTATO TRADE

BY JUSTUS MILLER, B.S.A.

THE potato extension work of the Province of Ontario as undertaken in 1918 had two definite objects. In the first place an effort was made to have farmers in Northern Ontario grow "certified" seed potatoes and to sell these co-operatively to farmers in old Ontario, while, inversely, the latter were encouraged to buy certified Northern Ontario seed potatoes co-operatively. In the second place the potato trade was studied from every angle with a view to organizing the industry on a more efficient basis so that growers of table stock both in Northern and in old Ontario might make larger profits whether by co-operative selling or otherwise. The former object was considered to be the more important of the two, however, in the initial stages of the work, as upon its success would depend to a large extent the success of the latter. Therefore the production and selling of certified seed has taken a large share of our attention in the past year.

CONDITION OF NATIVE SEED STOCK.

It was found in the beginning of the work that not all potatoes produced

in Northern Ontario were valuable as seed. Much of the crop was impure as to variety, standard varieties were not largely grown, black-leg was prevalent in some sections, and mosaic was by no means uncommon. Leaf roll, happily, was either absent or present in negligible quantities in most northern districts. Added to this was the fact that the best northern producing districts were hundreds of miles removed from the old Ontario counties, thereby making personal inspection of the crop in the field by the buyer impossible.

It is apparent therefore that some method of inspection was required which would guarantee the quality of the seed shipped from the north, thus ensuring satisfaction for the buyer and at the same time enhancing the value of the seed of the seller by a responsible recommendation. This inspection service* was supplied by the Federal Department of Agriculture under the district supervision of Paul A. Murphy, in charge of potato disease investigation. Mr. Murphy also conducted a survey in

*See "Potato Inspection Service" Part I, page 217, March *Gazette*.—Editor.

old Ontario to discover disease conditions, and, as it proved, by disclosing the true disease conditions, still further increased the demand for disease-free northern seed stock.

ORGANIZATION TO EFFECT IMPROVEMENT.

In order to secure the best advice and to ensure uniformity throughout an advisory committee termed the Ontario Advisory Potato Council was formed to discuss and pass on all extension work proposed. This Council is composed of all Department officials, both provincial and federal, working with potatoes in Ontario.

between departmental officials and farmers and between farmers themselves. During the first year of operation it was worked with the utmost harmony.

FOUNDATION STOCK FROM MARITIMES.

The first obstacle to be overcome was the dearth of first class foundation stock. In Algoma a comparatively small quantity of registered disease-free seed of the Green Mountain variety was being multiplied by a seed centre and in the same way a somewhat larger quantity of Irish Cobbler and Green Mountain seed in Rainy River. A carload of certified



EXAMINING POTATO CROP FOR DISEASES

The Agricultural Commissioner is chairman and the writer is secretary. Four meetings of the Council were held in 1918 and all work undertaken was sanctioned by this body. Working in co-operation with the Council and having direct charge of the extension work is an official termed the potato specialist, who co-operates also with the individuals of the Council in their respective fields and with the agricultural representatives. The whole extension scheme, in short, is founded upon the principle of co-operation between provincial officials, between provincial and federal officials,

Irish Cobbler seed was purchased in New Brunswick by the Ontario Department of Agriculture and distributed among farmers in Thunder Bay District at cost, less the cost of freight. These various sources supplied practically all the certified seed for shipment in 1918. Four other carloads of certified New Brunswick stock were distributed among other northern districts on similar terms, but they were found to be so badly contaminated with physiological disease as to be useless for seed purposes.

From these districts 14 carloads of "certified" seed were produced for export last year—7 of Irish Cobbler

and 7 of Green Mountain. Six carloads of Irish Cobbler were sold to farmers in old Ontario last fall. The seventh carload of very choice Irish Cobblers was shipped from Rainy River to Thunder Bay for additional foundation stock. Three carloads of Green Mountains were sold last fall to old Ontario farmers and tentative orders have been received for far more than the remaining four. These will be shipped in the spring. It may not be amiss to note here that the Irish Cobbler seems to be much the more popular variety and orders were received last fall for many times the quantity available.

margin above the prevailing price paid for table stock.

SEED SUPPLIES ON INCREASE.

Large stocks of certified seed have been kept by farmers in the north for this year's seeding. To augment this quantity a carload, already alluded to, was shipped to Thunder Bay District from Rainy River; a carload of disease-free Irish Cobblers has been shipped to Algoma from New Brunswick; and a carload of disease-free Green Mountains has been shipped to Parry Sound and Muskoka from Prince Edward Island. These car-



IRISH COBBLER POTATOES GROWING FOR SEED TEN MILES NORTH OF PORT ARTHUR

All these potatoes were sold co-operatively, the great bulk by associations organized for that definite purpose. Most of them were also purchased co-operatively by old Ontario growers. All this certified stock was sold at \$2.50 a bag f.o.b. point of delivery, netting the northern growers from \$1.90 to \$2.12 a bag according to location of shipping point and grade of stock. A difference of 15 cents a bag was charged between No. 1 and No. 2 grades, but the demand was entirely for No. 1. These prices were willingly paid by old Ontario growers and at the same time netted the northern growers a profitable

loads were purchase by the department, are now held in storage at strategic points and will be sold in the spring at a price not above cost. All this seed has been inspected and recommended by the federal disease inspectors.

Thus the north is in a far better position this spring than ever before as far as certified seed potato supplies are concerned. Granted average weather conditions, some fifty carloads of certified seed of the Irish Cobbler and Green Mountain varieties should be available for sale next fall. Old Ontario will probably demand a larger quantity, but the

time will come when northern production will exceed southern demands. In view of that situation an energetic campaign is now being outlined to capture a portion of the American demand for northern-grown, vigorous, disease-free seed potatoes.

AGRICULTURAL REPRESENTATIVES DEMONSTRATIONS.

To demonstrate the value of seed from different sources, the relative value of the two standard varieties, and the difference in yield when planted on sand and clay soils, a series of demonstrations were carried on in the counties of old Ontario under the supervision of the agricultural representatives. In each county two similar demonstrations were conducted, one on sand and one on clay. Each demonstration comprised the following plot arrangement:—

- Plot 1 Green Mountain potatoes grown in Northern Ontario.
- Plot 2 Green Mountain potatoes grown in old Ontario.
- Plot 3 Green Mountain potatoes grown in New Brunswick.
- Plot 4 Irish Cobbler potatoes grown in Northern Ontario.
- Plot 5 Irish Cobbler potatoes grown in old Ontario.
- Plot 6 Irish Cobbler potatoes grown in New Brunswick.

One bushel of seed was supplied for each plot, sufficient to plant one-tenth of an acre. Well drained land, uniform in character was chosen. Uniform fertilization and cultivation was given. The seed was treated before planting and the growing crops were sprayed for blight.

The seed secured was rather disappointing. In old Ontario the seed of several very good farmers who had carefully followed methods of selection was secured, but as the strains varied, the results lack the uniformity desired. All the Northern Ontario seed was secured from one grower in Thunder Bay District, but it was just ordinary field run stock which had never been selected, was not entirely pure as to variety and

was quite badly affected with black leg. The New Brunswick stock was all certified but proved to be badly diseased, particularly the Green Mountain variety, which averaged 61·8 per cent mosaic.

NEW ONTARIO SEED LEADS.

The calculations were made and direct supervision given by the various agricultural representatives. The inspection for disease was made by the botanical staff of the Ontario Agricultural College under the direction of Prof. J. E. Howitt.

The average yields of marketable potatoes of all plots calculated in bushels per acre were as follows:—

	Irish Cobbler.	Green Mountain.
New Ontario.....	153·4	177·5
Old Ontario.....	127·7	167·8
New Brunswick ..	148·0	137·3

In only 22 counties could the results *re* relative yields on sand and clay be taken as conclusive. In the other cases accidents, etc., prevented reliable calculations being made. In these 22 counties the yields in terms of marketable bushels per acre were as follows:—

	Irish Cobbler		Green Mountain	
	Sand	Clay	Sand	Clay
New Ontario..	167·5	142	184·1	165·8
Old Ontario....	133·8	111·8	170·5	165·5
New Brunswick	153·2	124·5	154·5	128·2
Average.....	151·5	126·1	169·3	153·2

Thus in every case considerably larger yields were secured on sand, although this is more noticeable in the case of the Irish Cobbler.

GREEN MOUNTAIN HEAVIEST YIELDER

Again summarizing the yields of marketable potatoes per acre from these two varieties in 22 counties we find the following yields were secured:

—	Green Mountain	Irish Cobbler
New Ontario.....	174.9	154.7
Old Ontario.....	168	122.8
New Brunswick.....	141.3	148.8
Average.....	161.4	142.1

These demonstrations clearly prove so far as may be proven by one season's demonstration, the superiority of New Ontario seed over both the old Ontario and the New Brunswick seed. If average old Ontario seed had been secured as was the case with the New Ontario the results would have been still more convincing.

This year the same demonstration will be conducted again but superior seed from all three sources and from one grower in each source has been obtained. A plot of the farmer's own seed, upon whose farm each demonstration is conducted will also be grown in comparison with this high class seed.

SERIES OF MEETINGS HELD.

In order to properly acquaint farmers both of Northern Ontario and old Ontario with the extension work of the Department in respect to the growing and distribution of northern-grown certified seed many meetings—inside and field—and personal interviews were held during the year. In Northern Ontario the advantages of growing certified seed of standard varieties, and of co-operative selling, were explained, while information of a general nature re best methods of production and marketing was given. In old Ontario the importance of planting northern-grown certified seed, the value of

producing standard varieties and the benefits arising from co-operative enterprise were particularly emphasized. The usual procedure was for the potato specialist in company with the local agricultural representative to visit a number of the best growers on their own farms and to talk the matter over while at the same time establishing a point of personal contact. Then a general meeting would be called at some convenient time and place under the supervision of the representative. Usually two or three speakers were provided who could discuss the potato industry from every angle.

Altogether 22 different interview trips and 20 meetings were held in New Ontario, and 19 interview trips and 6 meetings were held in old Ontario. In this way 590 growers were met in the course of the meetings while 343 were visited on their farms.

As a direct result of this work the good growers in several districts of Northern Ontario are making rapid progress toward the production of first class seed potatoes in large quantities and have sold, or are organizing to sell it co-operatively. In old Ontario tentative orders were secured for 19 carloads of seed potatoes, while nearly as many again were received as an indirect result. Apart from this, considerable interest was aroused in better methods of production, in the growing of standard varieties, in properly grading the stock for sale and in co-operative buying and selling.

ASSISTING FARMERS IN SELLING SEED.

1. During the summer tentative orders were secured in old Ontario, as already explained, for many carloads of northern-grown seed.

2. A list was made of all others with whom the Department had got in touch in various ways who might require seed.

3. A long list of potato wholesalers, wholesale jobbers, and retailers who purchase potatoes in carload lots was compiled. This list at present is not

nearly complete but partially serves the purpose.

4. An advertisement was published in the early part of October in all farm journals published in Ontario explaining the character of the seed for sale and announcing that the Department would put any who wished to purchase carlots of seed in touch with sellers of the same.

5. Just at digging time, when fairly accurate estimates of supplies could be made, the potato specialist made a trip to the northern districts that had seed for sale—Thunder Bay (principally) and Kenora and Rainy River. He found that the Thunder Bay Co-operative Marketing Association had set a price both for seed and table stock far too high to permit of many sales being made. He had a meeting of the directors called and the price lowered to \$2.50 per bag f.o.b. old Ontario for seed and \$2 per bag f.o.b. old Ontario for table stock.

6. To ensure seed of the proper quality a circular was sent to all northern farmers whose seed could be certified explaining the exact standard and requesting that great care be taken to fulfil it in every particular.

7. To acquaint buyers in old Ontario with the exact nature of the seed available and also to explain the system of grading, a circular was

enclosed in each letter sent giving these details in full.

8. To further assist the northern growers in disposing of their stock, shipping and price information was compiled and sent to each branch association of the Thunder Bay Co-operative Marketing Association and the agricultural representatives in Rainy River and Kenora, giving the exact freight charges and prices netted by farmers (at prices fixed) when shipped from any station in these three districts via all rail or lake and rail routes to any point in old Ontario. Information was also given *re* the securing of cars, the additional charges for refrigerator cars, the district agents to whom to apply, etc. We were also instrumental in securing sufficient refrigerator cars.

By advertisements and correspondence prospective buyers were placed in touch with representatives of the potato seed grower organizations.

By all these various methods, therefore, it has been sought to standardize two varieties of potatoes in Ontario, to promote a large scale seed industry in Northern Ontario and to encourage the planting of this seed in old Ontario. While many obstacles have been encountered, the work on the whole has been reasonably successful and should hasten the development in the near future of a new and important industry in the province.

SEEKING DISEASE-FREE STRAINS

BY W. R. LESLIE, B.S.A., PLANT SPECIALIST NORTHERN ONTARIO PLANT BREEDING STATION

AT the Northern Ontario Plant Breeding Station we have not secured results which give us specific information on the subject of disease-resistant varieties of potatoes. This is a subject of the utmost importance and is receiving close attention.

The two varieties in question,—Green Mountain and Irish Cobbler seem to be congenial hosts for the disease organisms common to potatoes. This past season it was noticed

that the former variety was more generally infested with mosaic than any other variety in the experiment plots of this station. Irish Cobbler seed was not good and the crop showed presence of blackleg and other soft rots.

While the red-skinned varieties of potatoes were comparatively free from rots, it is doubtful if any one of them was totally immune when planted on heavy and muck lands. Moreover, among the types of pota-

toes sent from Ottawa to be grown with the object of having them regain vigour, some of the red-skinned types seemed as much "degenerated" as the average among the white-skinned varieties.

Our aim is to isolate disease-free strains and propagate these where they shall be sufficiently removed from diseased plants so as not to become contaminated therefrom; to

keep notes on the vigour and health of various strains in the variety-test plots and to observe the effect of different types of soils on health and thriftiness of the various different strains.

One of the most promising lines of work seems to be the development of new varieties from seed here in the north where seed balls mature on the plants in quantity.

MANITOBA

DISEASE RESISTANT VARIETIES

BY F. W. BRODRICK, B.S.A., PROFESSOR OF HORTICULTURE

AT the recent Potato Conference held in Winnipeg the question of diseases in potatoes was very thoroughly discussed. We have learned from experience in Manitoba that our potato seed stocks are quite badly infested with disease, more particularly wilt, which develops a rot, and leaf curl which is a physiological disease and is exhibited only in the growing plant. While we have done nothing at the College to develop disease-resistant strains, we do everything we can to encourage growers to

use only healthy seed stock. It has been ascertained that some English varieties of potatoes are more resistant to disease than some of the popular kinds grown in Canada, but as a rule Old Country varieties have not given satisfaction from the standpoint of yield. It would seem that inspection of the growing crop as carried on in Ontario and some other provinces, is perhaps the most satisfactory method of developing healthy varieties.

BRITISH COLUMBIA

POTATO DISEASES

BY J. W. EASTHAM, PROVINCIAL PLANT PATHOLOGIST.

POATATO-GROWING in British Columbia differs from the industry in the rest of Canada in the wide difference of climatic conditions under which it is carried out. Some of the best known potato-growing regions occur in the dry belt, where the annual precipitation may be as low as five inches and where irrigation is absolutely essential. Under such conditions, diseases of the foliage favoured by a moist atmosphere are reduced to a minimum. Late blight, for instance, is only to be found in exceptional years or in those areas on the boundary line between

the irrigated and non-irrigated sections where, in fact, irrigation may be desirable, but is not necessary.

Both late blight and powdery scab, which have occasioned much loss and trouble to the potato-growers elsewhere in the province, are practically unknown in this dry belt, the chief diseases being the various fusarium rots of the tuber, and, of course, common scab.

Certain diseases which are now attracting serious attention in the east, such as, mosaic, curly-dwarf and leaf-roll, have not been noticeable in British Columbia as yet, although

a very bad case of the last-named on a small scale was observed last season.

The greatest difficulty in the improvement of the potato crop in British Columbia at the present time lies in the fact that such a large proportion of the industry has passed into the hands of Chinese and other Orientals. Whatever the merits of the Chinese may be as an agriculturist in other lines, his ideas in the matter of potato-growing are as poor as can well be conceived especially in the vital matter of the quality of the tubers used for seed. It is rare for him to plant anything which is at all saleable for market purposes, either in size or quality, and it is no infrequent thing to see tons of potatoes rotting with every form of disease hauled out to manure the ground which is going to grow potatoes in the coming season. As this land is usually only rented, the cultivator moving on when it becomes unprofitable, soil diseases have every facility for increase.

The methods which have been followed to improve the potato-crop may be classified under the headings "Inspection and Quarantine," "Educational Campaigns" and "Demonstration and Experimental Spraying."

INSPECTION AND THE ENFORCEMENT OF QUARANTINE.

The laws of British Columbia give very considerable powers to inspectors for this purpose. With the discovery in 1915 of powdery scab in the country, a careful survey was made of the main potato-growing areas for the purpose of mapping out the areas affected by it. The quarantining of all diseased crops with permission to market them only for local consumption and with restrictions as to the marking of containers, the destruction of refuse, etc., drew the attention of the growers to the necessity of taking more care in the growing of this crop. Incidental to the carrying out of the inspection, much information was given to the

individual grower and the result has been an appreciable raising of the standard of the crop.

EDUCATIONAL WORK.

Courses of lectures have been given where this could be done satisfactorily; that is, where the industry is in the hands of white men who are not too widely scattered to get together for the purpose. The services of one of the best potato-growers in the province have been enlisted to co-operate with officials of the department in this work. The features most emphasized have been seed selection and seed disinfection. The latter is being more practised to-day than heretofore, but it is to be feared that the average grower is still very negligent. Several circulars of information have been published on these phases of the subject and widely distributed. Owing to the present high price of corrosive sublimate as well as the rather dangerous nature of the substance, formaldehyde treatment has been the one mainly recommended. The desirability of the grower setting apart each year a special seed-plot for the improvement of his own seed crop has also been strongly emphasized.

DEMONSTRATION AND EXPERIMENTAL SPRAYING.

Although late blight annually exacts a large toll from the growers on the Lower Mainland resulting in many cases in a loss of 50 per cent of the crop, yet spraying has never been practised to any extent. The chief reason for this is that the potato-bug or Colorado-beetle, has not yet appeared in the province. Where this pest is present spraying is absolutely essential to save the crop, and when the spraying machinery is on the farm and the spraying has to be done in any case, it is easy to extend the operation against fungus diseases. During the past season, a number of one-acre plots in different parts of the Lower Mainland were sprayed

with a horse machine partly for the sake of demonstrating that late blight could be controlled, and partly for our own information as to what sprays were necessary under our climatic conditions. It was thought that with the potato-bug absent, and fairly dry weather without intense heat during the early summer, spraying might be postponed until towards the end of July with resulting economy in cost. It was shown, however, that even under these conditions, in certain areas, especially on peaty soils which burn up readily in hot weather, early blight can be destructive enough to necessitate early spraying. In

one of the experimental plots referred to, the plot was practically destroyed by early blight before the middle of July.

The results of the spraying so far as late blight is concerned were very satisfactory and attracted much attention amongst the growers. At present the chief difficulty in the way of the general adoption of spraying is to find a machine that will be suitable for areas of ten acres or more and not too costly. It is along the line of comparison of different types of machines as well as the fixing of the best times to spray that future work must be conducted.

WOMEN'S INSTITUTE WAR WORK

PRINCE EDWARD ISLAND

BY MISS HAZEL L. STERNS, SUPERVISOR OF WOMEN'S INSTITUTES

THE Women's Institutes of Prince Edward Island with a membership of 700, have during the full period of the war, accomplished in addition to supporting twenty-six prisoners of war, the following amount of patriotic work.

Money raised for Red Cross and other patriotic funds..\$	17,956 00
Knitted garments	12,547
Hospital comforts	1,155
Christmas parcels.....	1,195
Sundries, including Red Cross sewing	11,500

ONTARIO

BY GEO. A. PUTMAN, B.S.A., SUPERINTENDENT OF INSTITUTES.

IT is practically impossible to give a complete statement of the accomplishments of Ontario Women's Institutes in providing money and comforts for soldiers during the period of the war. Many branches worked entirely with the Red Cross Society in the respective towns. The amount of these cannot be properly estimated. Then again many of the branches did not fully report the work that they did, nor estimate the value of the articles made. From definite information available it has been shown that during the period of the war these contributions in money and articles amounted to \$1,386,046 in addition to a large quantity of goods supplied the first year, the value of which is not estimated.

Immediately upon the outbreak of war the women's institutes were appealed to by the Red Cross Society for a supply of pillows. The response was general, and all requirements were met within a short time. Instead of devoting their resources and time to the regular work of the institute, practically all of the members at once set to work to make various lines of Red Cross supplies, and donated large sums in cash. Contributions to the Red Cross Society, up to the end of March, 1915, amounted to \$30,384.06 and 1,142 bundles. In order that the patriotic needs might be all the more forcibly placed before the institutes throughout the whole province, it was decided that year to hold three conventions, at Ottawa, London and

Toronto, instead of only one as had been the custom previous to 1914.

During the year following the total of the givings in cash and goods were at least \$200,000, largely in finished articles ready to be sent on by the Red Cross.

Efforts were continued to increase the patriotic givings the following year, when in some sections of the province the individual branches, which average thirty-two or thirty-three members, contributed \$400 per branch, the donations in goods and cash for the year totalling well over the \$300,000 mark.

During the closing year of the war the majority of the branches devoted practically all their time to patriotic work in one form or another. The branches contributed during the year on an average:

165 pairs of socks valued at	\$ 247 50
275 other articles val- ued at	400 00
and cash.	315 00
	<hr/>
	\$ 1,050 00 for each Branch.

Or, for the whole province, 889 branches:

146,685 pairs of socks valued at	\$ 220,027 50
240,475 other articles and	355,600 00
	280,035 00 in cash.

Making a total for all
the institutes in
cash and goods of . . . 855,662 50

COMMUNITY CANNING CENTRES.

Early in the spring of 1918 a circular was sent out to the district officers of the Women's Institutes

emphasizing the great need for the conservation of the perishable products and what could be accomplished through co-operative effort in community canning centres, as one had been established at Parkhill in Middlesex County in the summer of 1917 and over \$4,500 worth of canned chicken, tomato soup, pickles, etc., had been put up for shipment overseas in addition to what had been done for home use. The circular stated that the Department of Agriculture through the Woman's Institutes Branch was prepared to co-operate in establishing canning centres in a number of localities by paying for the equipment and installing it and in sending a demonstrator to take charge of the centre—also that the Red Cross was anxious to co-operate if the centres wished to fill jars for shipment to Canadian Military Hospitals, by providing glass jars, or tin jars, labels, shipping cases, sugar, vinegar and spices. Six counties took advantage of this offer and canning centres were established at Barrie, Mapleton, Guelph, Stratford, Niagara on the Lake, and Echo Place in addition to the one established at Parkhill the previous year.

Circulars were then sent out to all the institute branches in the various counties, and also to the schools, asking for contributions of fruits, vegetables and chicken. There was a generous response and the output of the various centres is as given in the following table.

Product	Barrie	Grims- by	Guelph	Maple- ton	Niag- ara- on- Lake	Park- hill	Strat- ford	Total Product	Selling Price	Total Value
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	\$ cts.	\$ cts.
Vegetables	7,131	195	3,585	4,675	5,433	87	864	21,970	0 10	2,197 00
Soup		600			33			633	0 30	189 90
Fruit	25,440	411	363	1,683	6,081	6,822	5,436	46,236	0 10	4,623 60
Dried fruit			160					160	0 20	32 00
Pickles	1,215	300	1,260	894	504	480	480	5,133	0 08½	427 75
Jams	3,069	1,650	5,469	2,931	9,730	2,940	4,592	30,381	0 20	6,176 20
Jelly		300	10,545	5,421		7,143		23,409	0 22	5,149 98
Chicken	8,711		525	2,064		3,855	1,608	16,763	0 60	10,057 80
“ jelly	783			1,188				1,971	0 30	591 30
“ soup			429			4,839	951	6,219	0 30	1,865 70
“ fat	450			84		72	69	675	0 30	202 50
	<hr/>									
	46,799	3,456	22,336	18,840	21,781	26,238	14,000	153,450		31,413 73

MANITOBA

BY MISS HELEN MACDOUGALL, SUPERVISOR HOME ECONOMICS SOCIETIES

It is not possible to estimate the total amount of war work which has been accomplished through the rural organizations in Manitoba. The work has been carried on through a number of mediums, such as the Red Cross, the I.O.D.E., the Queen Mary Needlework Guild, the Secours Nationale, as well as a number of independent local organizations.

This report deals entirely with the work which has been accomplished by the Home Economics Societies. It must be borne in mind that in many places the members of the Home Economics Societies are members of some patriotic society as well, and therefore they do not report such work as belonging to their Home Economics Society. Also in a number of places, the members contribute both money and work to several societies. For these reasons we have no complete statement of the total amount of work that has actually been accomplished.

The amount of money raised for patriotic purposes was \$10,000 in 1915; \$15,000 in 1916; \$21,000 in 1917; \$24,000 in 1918, making a total of \$70,000 in four years. This is in addition to the money raised during the Red Cross drives.

A partial list of the comforts made and forwarded during the last two years of the war is given as follows:—

—	1917	1918
Socks	5,775	11,500
Shirts	2,500	3,764
Pyjamas	1,899	2,790
Dressing gowns	600	694
Helmets	200	476
Property bags	600	1,242
Hussifs	900	950
Handkerchiefs	5,000	5,658

In addition to the above, thousands of miscellaneous articles such as sweaters, scarves, wristlets, pneumonia jackets, bed socks, mittens, kit bags, slippers, etc., were also provided. During 1918 fully 6,000 boxes were packed with soldiers comforts, and sent overseas, each box valued at from \$4.00 to \$7.00.

A great many of the societies sent in supplies to the military hospitals, such as cases of fresh eggs, fruit, vegetables, canned fruits, also pillows, quilts, linen, surgical dressings, bandages, and other hospital supplies.

During the harvesting season hundreds of women and girls rendered assistance in stooking grain, driving teams, and in other ways helping to solve the labour problem.

All of this work was done in addition to the extra effort which was put forth in 1918 to increase food production, and to the conservation of it for future use.

A very special effort was put forth during the canning season, to can all surplus vegetables, and store them for use in the winter. A number of instructors spent their full time during the season, giving instruction in this subject. It is impossible to obtain an accurate statement of the total amount of canning done, but judging from the records we have on hand, we estimate that at least one million jars of vegetables were canned during the last season.

SASKATCHEWAN

BY MISS ABBIE DELURY, DIRECTOR, HOMEMAKER'S CLUBS

THE Homemakers' Clubs of Saskatchewan devoted considerable of their energies during the period of war towards providing money and comforts for Red Cross and other relief work. While complete records have not been forwarded

to headquarters, sufficient definite information is available to make a fairly accurate approximate statement which shows that of money \$95,000 was provided, and articles numbering 70,000, consisting chiefly of pairs of socks and hospital supplies.

SEED FAIRS

PRINCE EDWARD ISLAND

BY J. L. TENNANT, B.S.A., AGRICULTURAL REPRESENTATIVE

THE first seed fair in Prince Edward Island was held at Charlottetown on April 3, 1903. In the annual report of the Department of Agriculture for that year, the Commissioner of Agriculture, the Hon. Benjamin Rogers, referred to this fair in these words "With the view of stimulating the production of our own seeds, this Department (in conjunction with the Exhibition Association) has inaugurated a Provincial Seed Fair." At this fair there were ninety-seven exhibits of grain, grass and root seeds, which were judged by George H. Clark, Seed Commissioner, and the amount offered in prizes was fifty dollars.

The Provincial Seed Fair was held in Charlottetown up to 1907, when it was moved to Summerside. It has been held in the latter place each year since then.

This seed fair increased in growth and popularity from its inception, indicating that it filled an important place in the agricultural life of the province. In 1904 there were 100 exhibits, in 1908—636, and in 1911—probably the largest seed fair ever held in the province—there were 873 entries. In 1916 there were 326 entries, in 1917—197 entries, and in March 1918—287 entries. In 1917 the weather during the fair was extremely stormy which kept many exhibitors away. The fair of 1918 followed a very poor season, in which

the quality of the grain was much below the average. At the Maritime Seed Fair held at Summerside in December, 1918, and which included exhibits from New Brunswick and Nova Scotia, there were 612 entries.

Since 1915 the prize list of the Provincial Seed Fair has been divided into three classes—Class A, open to members of the Canadian Seed Growers' Association; Class B, open to competitors in the Standing Fields of Grain Competitions; Class C, general, open to exhibits not eligible for A or B. In Classes A and B there are sections for wheat, oats and barley only. In class C in addition to the sections for wheat, oats and barley, there are sections for potatoes, buckwheat, beans, peas, vetches, flaxseed, timothy, clover, root seeds and weed seeds.

At the Maritime Seed Fair in December, 1918, sections were added to classes A and B for potatoes. Another change made at this fair was the exhibiting of potatoes under type instead of under variety. This was a decided improvement and will likely be continued. The classification made was round white, oval white, long white, Rose, red-skinned, dark-skinned.

In 1911 a seed fair originally organized for Queen's county, but later thrown open to the whole province, was held at Charlottetown. This was called the Central Seed Fair. In that year there were 486

entries. This fair was discontinued in 1917, as it was found difficult to secure suitable accommodation.

In 1911 a seed fair for Kings county was held at Georgetown under the management of the Kings County Exhibition Association. In 1912 and 1913 local seed fairs were organized at Souris and Murray River respectively. Interest in these three fairs is still maintained. The entries at each fair vary from one to two hundred depending upon the quality of the crops harvested the previous season.

The prize list at these local seed fairs generally consists of three or four sections for wheat, five for oats, two for barley, four for potatoes, and one each for buckwheat, beans, timothy, clover, turnip seed, and eschallots. In wheat, oats and potatoes there are sections for the varieties most widely grown in the district and usually a section for any other variety. In barley there is one section for two-rowed and one for six-rowed varieties. The tendency now is to reduce the number of sections in each kind of crop to those varieties that are the most profitable and most suitable.

At practically all the seed fairs the largest exhibits are made in oats and potatoes, as the climate and soil of the province are particularly suited for these crops. Banner is the most extensively grown variety of oats. Old Island Black, Ligowo, and to a limited extent other varieties are also grown. In potatoes McIntyre, Green Mountain, Early Rose, Dakota Red and Irish Cobbler are the principal varieties exhibited. White Russian and White Fyfe are the most popular varieties of wheat. Other varieties grown are White Chaff, Marquis, and Red Fyfe. Old Island 2-rowed and a selection of it—Charlottetown. No. 80—are the prevailing varieties of barley, but there is a limited quantity of Duckbill and O. A. C. No. 21 grown.

SEED DISTRIBUTION

At the Provincial Seed Fair in 1910, the selling of the first prize seed

grain by auction was begun. This practice proved satisfactory and a few years later the second and third prize grain was also sold by auction. Since 1915 all the prize-winning exhibits at the provincial seed fair have been sold by auction on the last day of the fair. This method of disposing of the prize exhibits has only been followed to a limited extent at the local seed fairs. Where adopted it has resulted directly in distributing the best seed of the most capable seed growers to other farmers.

One rule of all the seed fairs requires the exhibitor to have for sale as per sample shown at least twenty bushels of oats, ten bushels each of wheat, barley and potatoes, and of other exhibits a quantity equal to that shown. The quantity of high class seed thus made available is quite large, but no records have been kept of the exact amount that has been distributed through the medium of the seed fairs.

As a means of advertising seed grain the seed fair holds an important place. The grower by making an exhibit at the fair places it where a large number of prospective purchasers can examine its quality and merit. The prominence given to prize winning exhibits through the press and in other ways also brings the seed to the attention of the public.

EDUCATIONAL METHODS

Educational meetings held in connection with seed fairs afford an opportunity for discussing questions that are of importance in the agricultural life of the province. Formerly at a number of the seed fairs, classes in seed judging were arranged. These were in charge of experts, were well attended and exerted a distinct influence in making farmers familiar with the qualities of high class seed. Visitors to the seed fair have a chance to compare different lots of seed, to meet the growers, and after examination of the samples exhibited to purchase any seed they wish to secure.

The training and education which the individual exhibitor receives is a very valuable one. He becomes familiar with the importance of purity, freedom from weed seeds, maturity, uniformity, vitality, and all those characteristics which determine the quality of seed. The intelligent exhibitor in comparing his own sample with others learns where it could be improved, and as a result of this he is in a position to produce better seed the following season.

The seed fair, in conjunction with the Canadian Seed Growers' Association and the Field Crops competitions, has had a direct influence in raising the standard of seed produced in the province. To-day Prince Edward Island produces each year several carloads of pure Banner oats of very high quality and vitality. As an example thirty-five thousand bushels of No. 1 Banner Seed Oats have been shipped to Western Canada

this year. In other grains the same improvement has resulted. The quality and type of the potatoes grown are much better. In place of the large, rough, coarse potatoes formerly in evidence at the seed fair, we now have a smoother, more uniform, higher quality tuber that peels with less waste and is higher in food value.

The seed fair has performed a great service in diffusing new ideas, and in introducing better varieties and types of farm crops. It has been an essential factor in the agricultural advance of the province, spreading knowledge concerning the value of good seed. By linking up the work of the Canadian Seed Growers' Association and the Field Crops competitions more closely with the seed fairs (both local and provincial) these latter can be made more useful in the future than even they have been in the past.

NOVA SCOTIA

BY H. S. CUNNINGHAM, DEPARTMENT OF AGRICULTURE

THE Seed Fair has undoubtedly been one of the most important agencies in extending the use of good seed.

In Nova Scotia this year, the Provincial Seed Fair, formerly held at the Agricultural College, Truro, was discontinued in favour of the Maritime Seed Fair, held at Summerside, P. E. I. This Maritime Seed Fair was formerly an important feature in connection with the Winter Fair held at Amherst in the month of December.

All classes were open to farmers of the Maritime Provinces and in addition there were special classes for members of the Canadian Seed Growers' Association and also for prize winners in the field crops competitions in each province. This was the principal advertising and distributing agency for the seed grower.

In Nova Scotia the local seed fair has always been strongly featured and it, combined with the fields crop competition, has been a strong

factor in promoting the use of good seed. The educational value of these local seed fairs has always been recognized. The judging has been done openly and in many cases public meetings are held in connection with them, where there is discussion on such subjects as "seed selection," "suitability of varieties," etc.

Each exhibitor is encouraged to state on his entry form the amount of seed he has for sale and the price. In this way the buyer is brought in touch with the consumer to their mutual benefit.

It is hard to give any figures which will demonstrate the value of the seed fair in the distribution of good seed but the fact that at present they are looking for 50,000 bushels of seed oats in the Maritime Provinces to supply the demand in the west is some criterion of what the local seed fairs, together with the Maritime Seed Fair, have been able to do in the way of advertising.

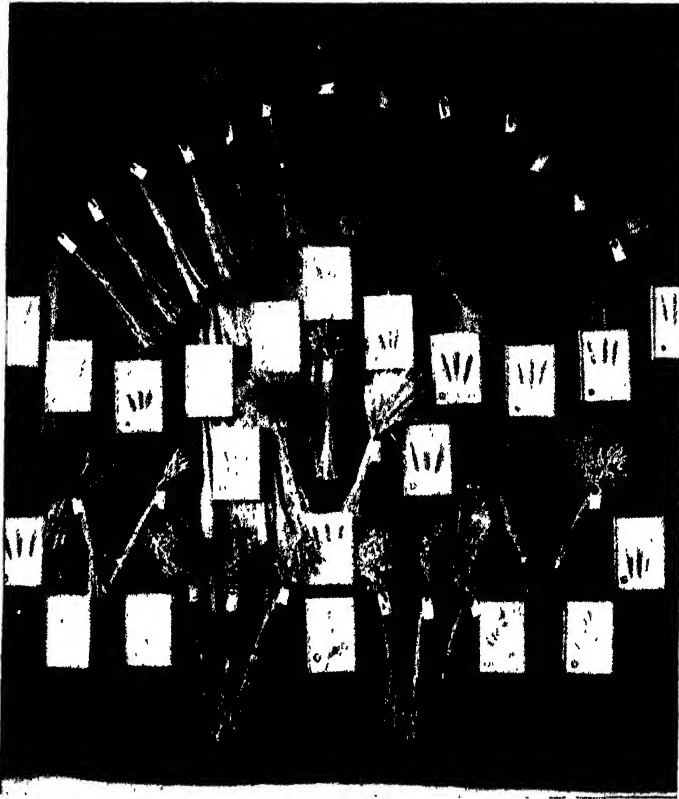
QUEBEC

BY OSCAR LESSARD, SECRETARY, COUNCIL OF AGRICULTURE.

THE seed grain fair is a powerful agent in crop improvement because it encourages the farmers to prepare their seed grain carefully and good seed means good crops. Such preparation, however, to be really thorough and practical, requires the use of a fanning mill. The number of such mills was rather

cultural progress, agree to put into practice the advice which they receive and are well satisfied with the results obtained.

The first fairs were held by the Agricultural Associations in 1911, 1912 and 1913. There were seven in 1911, eight in 1912 and eleven in 1913. At these fairs, the judges were



DISPLAY AT QUEBEC SEED FAIR

limited in our province before the fairs came into existence, but it has considerably increased during the last nine years with the advent of the seed fair, and with the efforts that were made to spread their use in the province. Fanning mills are now met with in most of our parishes, and sometimes several are found in the same district, and every year, a greater number of farmers who had hitherto remained indifferent to agri-

able to observe that, with very few exceptions, the quality of the grain shown left very much to be desired; the larger part of it contained such a high percentage of weed seeds and impurities that it was not fit for sowing. In view of the condition of things the judges decided that an energetic educational campaign should be started among the farmers, to urge them to procure the best seed grain possible, to take good care

of the growing crop, and finally to pass it through the fanning mill in order to remove the weed seeds. We are pleased to be able to state that this advice was followed, and substantial improvement was noted in the quality of seed grain shown at the fairs the following years. A large number of associations also came to realize the usefulness of the seed fair, and understand that the best way to work to the improvement of agriculture and show that they have at heart the interests of the industry, was to organize such fairs. The quality of the grain crop is an important factor in the prosperity of a country and means an increase of revenue for the farmers.

The gradual increase in the number of seed fairs organized by the agricultural associations since 1911 is shown in the following table:

1911	7
1912	8
1913	11
1914	23
1915	32
1916	39
1917	51
1918	61
1919	65

Each year products are judged by representatives of the Dominion Department of Agriculture and of the Quebec Department of Agriculture. These representatives also give lectures on the importance of

seed selection, they point out to the exhibitors the defects which should be removed and give advice when necessary. The reports of the judges show that the average of the exhibits varies from 60 to 100 per cent. that their quality often scores about 90 per cent, and the results obtained so far are satisfactory.

These fairs also enable the exhibitors to sell their surplus seed grain to farmers of the neighbouring districts. It is not easy to assert the exact quantity of grain sold in this fashion, but we think we may say, without any exaggeration, that these fairs open a permanent market to exhibitors in enabling them to sell several hundred bushels of grain of good quality for seeding.

In addition to seed grain fairs held by associations, there is each year a provincial seed grain exhibition which is held at Quebec. The best exhibits shown, or to be shown, at the associations' fairs may be seen at this exhibition. The scoring done by the judges at this exhibition shows that most of the exhibits are of superior quality. If now we say that in 1917 and in 1918 the number of entries for the Quebec exhibition was over 500, it will be sufficient to show that the farmers now understand how useful and how important it is for them to work to the improvement of their seed grain.

ONTARIO

BY J. LOCKIE WILSON, SUPERINTENDENT OF AGRICULTURAL SOCIETIES

S EED Fairs are the natural sequence of standing field crop competitions. They are two kinds, local and provincial. At the local seed fair the competitors in the standing field crop competitions in a society compete with threshed grain. The local seed fair is doing an excellent work, but its benefits are largely confined to the members of the agricultural society which holds it. Nevertheless, it is the means of interesting increasing numbers of farmers each year in their own local

field crop competition and much valuable grain by this means receives a wide distribution.

Chief among provincial seed fairs stand those held at Guelph and Ottawa during the winter season, while the seed exhibits at the Canadian National and Central Canada Exhibitions, handled entirely by the Agricultural Societies' Branch of the Department of Agriculture, might also be considered as coming under the same heading.

Prize winners in the standing field crop competitions from that part of the province west and southwest of York and Simcoe counties, but including Muskoka, exhibit at Guelph, and the rest of Ontario at the Ottawa Winter Fair. At these winter fairs there is always a large attendance of farmers desirous of purchasing seed grain, the bidding is spirited, and the prices realized become higher each succeeding year. Much educational work, also, is done among the farmers who examine the carefully prepared sheaves which serve to decorate the exhibits.

For the Canadian National Exhibition, in order to give settlers in New Ontario a fair chance in their exhibits so that they do not have to be pitted against the earlier harvested and more carefully sorted grain and sheaves from the older settled parts of Ontario, the province is divided into three sections, west, east, and north of York County. At the Central Canada these divisions are not made and all show together. At both these large exhibitions there are splendid exhibits of grain and sheaves and they form a striking display of the magnificent grain that can be and is grown in all sections of this province.

Thousands of bushels of good seed grain have been purchased by farmers in Ontario since the standing field crop competitions were inaugurated in 1907 and every purchaser becomes an enthusiast in demonstrating the value and importance of using nothing but the best and purest seed grain in order to raise good crops from which seed can in turn be sold to others. Nor are the farmers in this province the only purchasers. Much is sold to go to other sections in Canada and also to the United States. At the last Guelph Winter Fair one of the largest purchasers was the Heart's Delight Farm, Chazy, N. Y., a

mammoth farm organization which thus recognized the value of our Ontario seed grain.

The Verulam Agricultural Society with headquarters at Bobcaygeon, due to the enterprising work of its energetic secretary, Mr. Wm. Hickson, has acquired a most desirable reputation for good seed and has sold quantities here and in other countries.

The Ontario Department of Agriculture furnishes judges for seed fairs free of charge to the society and these experts usually deliver addresses on the selection of seed grain and give reasons for their decisions.

Ontario farmers are endeavouring to encourage the standardization of field crops, and the Ontario Association of Fairs and Exhibitions, through a committee of experts, has recommended that the following varieties of grain and potatoes be considered as standard ones, and the competitor in the field crop competitions who fails to utilize the standard grain and potatoes as approved by the Association will have two points deducted from his total score. The following are selected as standard varieties:

Fall Wheat—Dawson's Golden Chaff (White), Imperial Amber (Red)

Spring Wheat—Marquis, Red Fife, Wild Goose.

Oats—O.A.C. No. 72, Banner.

Barley—O.A.C. No. 21, Mand-scheuri.

Peas—Golden Vine, Canadian Beauty (White Marrowfat), Arthur.

Beans—Pea.

Corn (Dent)—Wisconsin No. 7, White Cap Yellow Dent, Bailey, Golden Glow.

Corn (Flint)—North Dakota, Long fellow Quebec Yellow.

Potatoes—Green Mountain (Delaware), Carman No. 1, Gold Coin, Davies Warrior, Dooley, Irish Cobbler (Extra Early Eureka), Early Ohio.

THE SUPPLYING OF SUITABLE SEED

NOVA SCOTIA

BY M. CUMMING, B.A., B.S.A., SECRETARY FOR AGRICULTURE.

NOVA SCOTIA has an abundance of first-class seed of practically all kinds for the present year. To such an extent is this true that the Department of Agriculture has adopted no general

policy to assist farmers in obtaining seed except in so far as those inquiring for seed are directed to sources where registered and commercial seeds of all kinds are available.

NEW BRUNSWICK

BY E. P. BRADT, B.S.A., SECRETARY FOR AGRICULTURE

IT has been ascertained that there is sufficient seed in the province of New Brunswick to supply the needs of growers for the coming planting season. The department has established a system of aid in its proper distribution. In certain parts where grain crops were damaged last year by bad weather a large amount of seed grain will have to be purchased. To facilitate this the department, through the office of the Secretary for Agriculture, will act as an exchange depot where correspondence of buyers and sellers will be received and the buyers directed to persons

who have seed for sale which will meet their demands. A sample market for the sale or exchange of farm seed was afforded the public in the provincial seed fair which was held in Fredericton in March. Exhibitors were thus given the opportunity of listing, at the time of making entry, all seed which they had for sale. Officials of agricultural societies in the province were advised of the quantities listed at this seed fair. Through this agency a large amount of the very best seed has been made available to those desiring to grow the best varieties of first class quality.

QUEBEC

BY J. A. GRENIER, DEPUTY MINISTER OF AGRICULTURE

ON account of the excellent crop harvested in Quebec last year a lesser quantity of seed than usual will be required by the farmers this spring. Those who require seed grain may secure all that they need through the Seed Purchasing Commission of the Dominion Government which has an office in

Quebec and of which Mr. Jules Simard is the representative, or through the Seed Producers Agricultural Co-operative Association at Ste. Rosalie or the Comptoir Co-operatif of Montreal. The Seed Purchasing Commission has in the elevators all the grain that may be required by the farmers.

ONTARIO

BY W. BERT ROADHOUSE, DEPUTY MINISTER OF AGRICULTURE.

THIS Department has no special plan for assisting farmers to secure seed for the ensuing season. During the past couple of years an arrangement was carried out

in co-operation with the banks by which farmers were enabled to borrow \$200 for the purchase of seed. This was essentially a war measure and is not being renewed this year. The

Department, of course, through its local offices, as well as through its general organization, distributes information as to kinds and quality of

seed to be used and to some extent as to where it can be secured, but there is no special provision with reference to the approaching season.

MANITOBA

THERE is a shortage of good seed of oats and barley in the province of Manitoba this year. The shortage of wheat seed is not so acute but there is considerable call for seed of first-rate quality and variety. To assist farmers in meeting the need the Field Husbandry Department of the Agricultural College has got into touch with a large number of farmers throughout the province who have reliable seed of good varieties for sale. Of oat varieties, Banner, Victory, Gold Rain, Abundance and Leader are offered in quantities ranging in some cases to car-load lots and at prices ranging from \$1 to \$1.50 per bushel. The varieties of barley available are O.A.C. 21, Malster and Mensury.

These are priced at from \$1.25 to \$1.50 per bushel. Supplies of Marquis and Red Fife wheats have been located at prices running from \$2.50 to \$3 a bushel. Spring rye is also offered to the Department at \$1.50 to \$2.40 a bushel. The Department will not handle this grain but will supply the names of those who have seed for sale to inquiring purchasers.

The government of Manitoba has at the present session enacted legislation with a view to assisting needy farmers in securing seed grain. As in former years, the municipality is empowered to borrow money either from the provincial treasury or elsewhere, to purchase seed grain up to \$1,200 for those requiring financial assistance for this purpose.

SASKATCHEWAN

BY M. P. TULLIS, WEEDS AND SEED COMMISSIONER

THE distribution of seed grain on credit terms in the province of Saskatchewan, it is hoped, will soon be a thing of the past. Farmers, in general, are becoming more firmly established financially as a result of better tillage methods and, to some extent, a safer system of farming. At the present time seed is advanced to the needy in rural municipalities by the local officials, and in unorganized territory (where there is no local authority) by the Provincial Government through the Department of Agriculture.

Rural municipal officials are empowered by authority of "The Municipalities Seed Grain Act", to borrow money for the purpose of supplying seed grain to needy ratepayers on patented lands who apply for assist-

ance. Where the total funds necessary do not exceed two thousand dollars for the whole municipality, it may be raised by resolution of the council, but if the amount is in excess of two thousand dollars a by-law must be submitted to the electors. The municipality may advance seed to the extent of two hundred and fifty dollars in value per quarter section. The following recent amendment to "The Municipalities Seed Grain Act" makes provision for an additional advance to those who have not paid up their seed indebtedness from previous years:

".....Where an advance of grain was made in any previous year and there remains of the price of such grain an unpaid balance, a fresh advance may be made in respect of the same land not ex-

exceeding \$250 in value, but in no case shall the amount of such fresh advance, together with such unpaid balance, exceed in the aggregate \$450."

Since there are no local officials in the unorganized districts of the province, seed applications from deserving settlers on patented lands are dealt with by the Saskatchewan Government through the Department of Agriculture. Advances are made to the extent of \$250 per quarter section for seed and \$75 for fodder. A similar 1919 amendment to that quoted above, was added to "The Local Improvements Act" thus making provision for a further advance to those who are still indebted for seed obtained last year.

This year a schedule of meetings was arranged at different railway points tributary to local improve-

ment districts in southwestern Saskatchewan where it was necessary to furnish seed. Applicants were asked to meet representatives of the Department at the most convenient point, make application, sign security papers and receive seed orders. On account of the scarcity of seed and feed oats a supply was shipped in and delivered to applicants while orders for wheat were issued on local farmers or dealers.

Homesteaders on unpatented lands anywhere in the province are taken care of by the Dominion Government.

It is now possible for mortgagees holding mortgages against farm lands to supply seed grain to their mortgagors and add the cost of same to the amount secured by the mortgage. This authority is embodied in "The Seed Grain Advances Act, 1919."

NOVA SCOTIA

MARITIME DAIRY SCHOOL ORGANIZED

A DAIRY school covering the three maritime provinces of Prince Edward Island, Nova Scotia, and New Brunswick has been organized at the College of Agriculture at Truro, N.S. under the directorship of Mr. E. P. Bradt, B.S.A., Secretary for Agriculture, New Brunswick; Professor M. Cumming, B.A., B.S.A., Secretary for Agriculture, Nova Scotia, and Mr. W. J. Reid, B.S.A., Director of Agricultural Instruction, Prince Edward Island. Three major courses were arranged, for creamery men, March 12th to 25th; cheese makers, March 26th to April 3rd; milk testers, March 12th to April 3rd. A supplementary course on milk testing from March 26th to April 3rd was given for those wishing to qualify for milk testers under the

cow testing regulations of the Dominion Department of Agriculture. The staff consists of the dairy officials of the three provinces, besides members of the staff of the Nova Scotia Agricultural College. The courses are free to dairy men in any of the three provinces who have had at least one season's experience in either a cheese factory or creamery and others who make special arrangements to take the course. The respective Departments of Agriculture refunds the railway fares of students from their provinces. As principal of the Nova Scotia Agricultural College Professor M. Cumming is the principal of the Dairy School, while Mr. W. A. MacKay, Dairy Superintendent of the Nova Scotia is the immediate head of the school.

AGRICULTURAL ACTIVITIES

SHORT COURSES

BY J. G. ARCHIBALD, B.S.A., DEPARTMENT OF AGRICULTURE

THE postponed short course at the Agricultural College, Truro, has just been concluded with an attendance of 200 and was very successful. The attendance at the ladies' course held in conjunction with the farmers' course was about seventy-five. All the usual features of short course work were included and in addition a special course was given in the operation of tractors.

At the conclusion of the course, the Nova Scotia Farmers' Association held its annual meeting, consisting of six sessions which were largely attended. In this connection it may be of interest to mention the address given at the opening session by Prof. Cumming on "The Agricola Centenary". It is just one hundred years since the writings of John Young appeared in the public press under the pen name of "Agricola". This man was the pioneer writer on agricultural subjects in the Maritime Provinces and, we are inclined to think, in all Canada. His splendid writings have been an influence toward the betterment of agriculture even to this day. He was the first secretary of the Agricultural Board of the Province of Nova Scotia.

Lieut. J. G. Robertson, of the Soldiers' Settlement Board, recently met the agricultural representatives and addressed the Farmers' Association, outlining the plans of the Board for the placing of returned men on farms. Lieut. Robertson is a Nova Scotian, a graduate of Macdonald Agricultural College and has seen much active service in France.

The Maritime Dairy School has commenced its sessions with an attendance of fifty.

During the short course a rather important and significant association was organized. About twenty-five graduates of the N.S. Agricultural College met and formed an alumni association with the usual aims and

objects of such societies. All graduates of the institution are eligible for membership.

The most important resolution passed by the meeting, was one which authorized the executive committee of the Association to proceed at once toward the placing in the College of a memorial tablet to those of our number who have fallen in the war.

SURVEY WORK IN GUYSBORO COUNTY

Mr. A. B. Macdonald, the agricultural representative for Guysboro county, realizing the necessity of having accurate and complete knowledge of the actual conditions on all farms over which he has supervision is making a survey of the farms in the eastern end of the county. The method he has adopted consists of sending out question sheets, asking the number and kind of stock kept; the different kinds of feeds fed; production of herd; rotation followed, and such questions as will give a general idea of conditions on all farms. Along with this sheet is sent a circular letter, explaining the reason for getting such information and the necessity of having such question sheets returned. In order to secure the greater number of these sheets being sent back to the office, an addressed, stamped envelope is enclosed. For those who do not answer, the representative hopes to secure the necessary information by individual calls to their farms. After all question sheets are collected and data tabulated, Mr. Macdonald will have a clearer idea of what the chief drawback to farming in the county is, and will be better able to formulate plans for the furthering of his work. There is a question on the sheet asking in what particular way the representative can best help the farmer. From the replies already received at the office, many personal

difficulties are mentioned, which gives the representative an opportunity of getting in closer touch with the farmer since he will need to call and suggest a means of overcoming such difficulties.

SEED FAIR

During the first week of February, the first seed fair in Guysboro county was held. About eighty exhibits of grain and vegetables were brought in. This may appear a very poor showing to those who are accustomed to large shows; but when we consider that two years ago, elementary instruction had to be given in the grading and selection of seed in this county and that, due to weather conditions, only a very small percentage of the farmers were able to exhibit, the showing was quite creditable. Particularly so since the quality of exhibits was by no means inferior. A considerable amount of work had to be done to have seed brought in, in good condition, nevertheless Mr. Macdonald says that he is quite satisfied with the fair, and claims that the farmers in the county are taking greater care to sow better seed since they realize that they are increasing their yield by so doing. A regular programme was arranged for the day of the Fair. Prof. J. M. Trueman and Mr. S. J. Moore from the Agricultural College at Truro, gave addresses on the feeding of dairy cattle and production of registered seed. In the evening the Co-operative Company held their annual meeting. From the fact that the company, consisting of about one hundred members, covering but a small territory, has decided to hire a manager with a salary of \$2,000 per year, we can safely say that co-operation is making progress in the county.

BOYS' POULTRY SHOW

In the first week of January the Chedabucto Poultry Club held their

second annual poultry show. This club is made up of the boys in Guysboro town, and was organized two years ago by the representative. The increased number of exhibits and the good condition of the birds, certainly show that a keen interest in poultry-raising is growing up among the boys. Lionel Trivett won the cup for the best exhibit of any one breed. His exhibit of Light Brahmas was equal to any in the province. The club is anticipating the organizing of other clubs in nearby school sections, with a view to encouraging their neighbouring school mates in the raising of pure-bred poultry.

MOTION PICTURES ON FARMING

Last July Mr. Macdonald was supplied by J. C. Tory, Federal Representative for the county, with a moving picture machine of the Pathescope type. By borrowing films from the Ontario Department of Agriculture, Mr. MacDonald was enabled to hold a series of interesting meetings throughout the county. At these meetings part of the evening was given to showing films on farming, while the rest was taken up with a lecture on some phase of farming that was of particular interest in the community where the meeting was held. During the month of February, through the kindness of the Ontario Department of Agriculture, the representative was enabled to secure another set of films which were used for several weeks in a similar way.

NEW AGRICULTURAL SOCIETIES

Some time has been given this winter to the organizing of agricultural societies in outlying sections. It is hoped that within a reasonable length of time, enough societies will be in existence to serve all the farmers in the county with pure-bred sires.

QUEBEC

MACDONALD COLLEGE

DISTRIBUTION OF FRUIT PLANTS

MACDONALD College, through the Horticultural Department, will, in the month of May this year, supply one hundred strawberry plants of two good varieties to each of twenty-five boys or girls in the province. An equal number of boys will each be supplied with sixty raspberry plants. In order to select the boys or girls to whom will be sent these donations, sets

of questions are mailed to applicants, the answers to which, when returned to the College, will be the guide to the officials in deciding to whom the plants should be sent in order to accomplish the desired end. The object of the distribution is to interest boys and girls on farms in small fruit culture in districts where at present there are no cultivated fruits of these kinds grown.

ONTARIO

MR. C. F. BAILEY, AGRICULTURAL COMMISSIONER

MR. C. F. Bailey, B.S.A., whose promotion was announced in the March number of the Agricultural Gazette, in addition to having the general supervision of the field activities of all branches of the Department, will administer the agricultural work of the Department of Lands, Forests, and Mines in Northern Ontario. Mr. Bailey's title is Agricultural Commissioner and not Commissioner of Agriculture, by which title Dr. Creelman was designated during the past two years and until his retirement in February.



MR. C. F. BAILEY, B.S.A.

RESULTS OF COMPETITIONS CONDUCTED BY JUNIOR FARMERS, 1918.

BY R. S. DUNCAN, B.S.A., SUPERVISOR, AGRICULTURAL REPRESENTATIVES

DURING the past few years, the Ontario Department of Agriculture through its Agricultural Representatives have been conducting profit competitions in feeding

hogs, field crops, producing milk and feeding calves and marketing them at the stage known as baby beef.

These competitions were open to young men, farmers' sons, under 30

years of age, the prize being a free two weeks' course in stock and seed judging, poultry raising, horticulture, farm dairy, beekeeping or farm power conducted at the Ontario Agricultural College at Guelph and return, and board and lodging while there.

All the competitions started off in the spring of the year under fairly favourable circumstances but owing to war and labour conditions a number of the contestants were forced to drop out before the competitions were concluded.

The prize was awarded to the young man showing the largest net profit per acre. Where eight or more contestants finished in a competition two men were sent to Guelph.

The competition was confined to a field of any size but not less than one acre, except in the case of oats, barley and wheat when the area under crop was at least five acres. This enabled the contestants to enter the Standing Field Crop Competitions conducted under the auspices of the Agricultural Societies.



WINNING FIELD IN THE ACRE PROFIT COMPETITION, PORT ARTHUR SECTION

The prize winners taking the courses at the Ontario Agricultural College this winter are as follows:—

Stock and seed judging, Jan. 14-24	29
Beekeeping, Jan. 14-24.	1
Poultry raising, Jan. 14-24.	1
Farm dairying, Jan. 21-31	1
Farm power, Jan. 27-Feb. 7	7

ACRE PROFIT COMPETITIONS

There were eighteen contests during the past season with different crops as follows:—

Potatoes.....	4
Beans.....	1
Oats.....	4
Corn for Seed.....	1
Sugar beets.....	1
Mangels.....	1
Wheat.....	6

In estimating the cost of production \$5.00 per acre was allowed for rent of land, \$2.00 per acre for ploughing, 15 cents per hour for man labour and 10 cents per hour for horse labour.

A uniform price was placed on all seed used in the spring as follows:—

Turnips	\$1 50 per lb.
Mangels	1 00 "
Corn	4 75 per bush
Beans	9 00 "
Potatoes	1 35 "
Wheat	2 50 "
Barley	1 75 "
Oats	1 10 "

The following is a list of the winners, giving results as to cost of production and net profit per acre with various crops:—

OATS
(80c. per bush.)

County	Winner	Yield Bush.	Cost Prod.	Profit
Lambton.....	Russel Clark, R.R. No. 1, Alvinston ..	79	14.61	48.59
Essex	W. G. Sellers, Amherstburg.	76½	13.93	47.07
Norfolk	Leo Challand, R.R. 5, Simcoe	70½	16.06	40.10
Lincoln.....	Gordon J. Robbins, R.R. No. 3	70½	17.27	39.00

POTATOES
(\$1.20 per bush.)

Thunder Bay.....	Jas. Taylor, Port Arthur ..	283	49.80	289.80
Rainy River	Wm. Draycott, Stratton ..	284	53.05	287.75
Middlesex.....	Geo. A. Pack, R.R. 1, Byron ...	236	46.60	236.60
Norfolk.....	Bruce Wilson, Wilsonville ..	135½	33.72	129.02

CORN FOR SEED
(\$3.50 per bush.)

Essex.....	Howard Sellers, R.R. No. 1, Kingsville	27	14.10	80.40
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SUGAR BEETS
(\$10 per ton)

Lambton.....	Cecil Campbell, R.R. No. 4, Alvinston ..	Tons 18½	21.88	163.12
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BEANS
(\$7.50 per bush.)

Grenville.....	Earl Throop, R.R. No. 2, Prescott. ..	Bush. 31½	33.45	202.80
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MANGELS
(15c. per bush.)

Durham	Harry Jose, Newcastle.	785	49.70	68.05
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WHEAT
(\$2.15 per bush.)

Manitoulin	Allan Fraser, Gore Bay.....	47	19.70	81.35
York.....	Allan F. Balsdon, R.R. No. 2, Markham	45	19.30	77.45
Durham.....	L. Stanley Chapman, R.R. No. 1, Orono	44½	20.26	75.77
Grenville.....	Wilbert A. Davidson, R.R. No. 4, Kemptville	33½	14.93	56.82
Renfrew.....	Robt. L. Mason, R.R. No. 3, Renfrew ..	28	14.15	46.05
Dundas.....	A. A. Morrison, Wales.....	25½	16.87	37.60

FEEDING HOGS FOR PROFIT
COMPETITIONS

All told there were eleven contests conducted in as many counties and districts of the Province.

The winner was selected on the following basis:—

- (a) 50 points for the highest net profit per cwt. of gain.
- (b) 25 points for type and finish, this being done with the bacon hog score card.
- (c) 25 points for the best kept records and most comprehensive report.

Six entries were required before a competition could be conducted and two men were sent to Guelph provided eight men finished.

Each contestant had to feed a pen of hogs containing not less than four. Hogs were weaned and weighed at six weeks of age, at which time the record work began. An accurate account was kept of the kind and amount of food consumed every four weeks in addition to the final feeding. Credit was given contestants who weighed their hogs at the end of every four weeks though this was not compulsory. Hogs were to be finished any time within 28 weeks of age

when they had attained a weight anywhere between 180 and 200 lbs. One point was deducted for each 5 lbs. or fraction of 5 lbs. under or over these weights.

Feed was valued as follows:—

Ground oats	\$55 00	per ton
" barley	70 00	"
" peas	110 00	"
" rye	90 00	"
" wheat	65 00	"
" corn	80 00	"
Corn on the cob	75 00	"
Bran	35 50	"
Low-grade flour or red dog ..	75 00	"
Shorts or middlings	40 50	"
Tankage	85 00	"
Oil cake	65 00	"
Green feed	2 00	"
Skim milk	5 00	"
Butter-milk	5 00	"
Whey	3 00	"
Pasture	1 00	per hog

The profit was estimated by valuing the average gain in weight per hog at 18½c. per lb.

Readers will note that the value of the hog at 6 weeks of age was not taken into consideration at all. The determining factor being the average net profit per cwt. of gain from six weeks of age, when the feeding period and record work commenced.

The results are given in the tabulated statement below:—

FEEDING HOGS PROFIT COMPETITION

County	Winner	Breed	Length of Feeding Period	Average cost of feed per hog	Average weight of hogs live weight	Value per hog of gain in weight	Average net profit per hog	Average net profit per cwt. of gain
				\$	Lbs.	\$	\$	\$
Durham.....	J. A. Hickson, No. 1.	Yorkshire Pure Bred.	May 31—Sept. 20	7 50	230	38 43	30 93	15 08
Essex	L. Squire, No. 2.	Poland China	May 13—Oct. 14	5 94½	184	29 62	23 68	14 98
Grenville	T. R. Beckett, No. 5.	Grade York-shire.	April 17—Aug. 29	10 50	209	34 87	24 37	13 10
Manitoulin. . .	Milton VanEvery, Meldrum Bay.	Pure Bred Berkshire.	May 30—Sept. 7	7 57	143	22 50	14 93	12 44
Lincoln.	K. Comfort, No. 1.	Pure Bred Yorkshires.	May 21—Oct. 17	11 58	198	33 38	21 80	12 24
Dundas	C. F. Marshall, South Mountain.	Pure Bred Yorkshires	April 26—Sept. 25	16 19	209½	35 51½	19 32½	10 20
Waterloo	L. Weber, No. 1.	Yorkshire.....	April 16—Sept. 23	14 39	187½	30 75	16 36	9 97
Peel.....	Cecil J. McCort, No. 3.	Yorkshire-Berk-shire Cross.	June 20—Nov. 21	15 24	188	30 00	14 76	9 23
Lennox and Ad-dington.	A. T. Empey, No. 4.	Yorkshire.....	April 22—Sept. 12	17 17	200½	32 77	15 60	8 92
Oxford.....	G. Kaufman, No. 4.	Yorkshire.....	April 1—Aug. 3	10 78	198½	31 17½	3 27	7 98
	Brigit.							

DAIRY PROFIT COMPETITIONS

The Dairy Profit Competition is one of the most interesting of all the competitions conducted and a close study reveals some very valuable data. Unfortunately a number of young men who commenced the record work last spring had to drop out owing to the operations of the Military Service Act. There were only four contests in the Province during the past season.

The prize was awarded to the young man showing the largest net profit from one heifer, the competition extending over a period of seven months. Only heifers freshening for the first time were used and such heifers had to be under 36 months of age at the time of freshening.

Each contestant had to take a two ounce sample of milk (one ounce in forenoon and one ounce in afternoon) three times each month and forward samples to the Representative's office where they were tested for butter fat. Milk had to be weighed and recorded

at each milking and an accurate record had to be kept of the kind and amount of feed consumed. The milk was valued on the following basis:—
First three months, butter fat valued at 50c. per lb.

Second three months, butter fat valued at 53c. per lb.

Last month, butter fat valued at 55c. per lb.

The skim milk was valued at 20c. per cwt.

The feed was valued as follows:—

Ground oats	\$55 00	per ton.
“ barley.....	70 00	“
Bran.....	35 00	“
Shorts and middlings	40 00	“
Gluten feed.....	60 00	“
Oil cake.....	65 00	“
Cottonseed meal.....	60 00	“
Hay and clover.....	12 00	“
Alfalfa.....	14 00	“
Timothy and mixed hay.....	10 00	“
Silage.....	4 00	“
Roots.....	3 50	“
Straw.....	6 00	“
Pasture.....	1 00	per mon.

The following are the results in detail together with the breed of heifer winning in each county contest:—

DAIRY PROFIT COMPETITION

County	Winner	Breed	Value of feed	Milk	Fat	Fat	Value	Skim milk	Value	Net Profit
			\$ cts.	Lbs.	per ct.	Lbs.	\$ cts.	Lbs.	\$ cts.	\$ cts.
Dundas.....	Lloyd Poapst ..	Holstein	25 31	5,337	4·3	232·99	119·36	5123·49	10 24	104 29
Middlesex. . .	Ross Sadler... ..	Holstein Grade.....	65 44	7,106	3·97	281·77	145·66	6831·6	13 62	93 85
Lennox and Addington.	Percy Vine... ..	Holstein	7 00	4,544	4·7	177·00	91·40	4366	8 73	93 13
Grenville	Elmer White ..	Holstein.....	11 59	4,830	3·8	176·1	91·18	4655	9 29	88 88

BABY BEEF COMPETITION

In the Baby Beef Competition the prize was awarded to the boys or young men producing the best steer regardless of cost of production. In order to gather data, an accurate account had to be kept of this kind and amount of food consumed during the feeding period. The calves in this competition were born on or after Sept. 1, 1917. The steers were judged in November last by the Agricultural Representatives and the winners had the privilege of competing in a special class for baby beef at the Winter Fair held at Guelph in December.

In estimating the profit, the initial value of the steer calf was placed at \$5 and the value of the steer when marketed at 15c. per lb., live weight. Feed consumed during the period was estimated as follows:—

Ground oats.....	\$38 00	per ton.
“ barley.....	40 00	“
“ peas.....	60 00	“
“ rye.....	38 00	“
“ wheat.....	50 00	“
“ corn.....	35 00	“
Bran.....	30 00	“
Low-grade flour or red dog..	36 00	“
Shorts or middlings.....	30 00	“
Tankage.....	50 00	“

Oil cake.....\$50 00 per ton.
 Green feed (name kind in
 report)..... 2 00 "
 Skim milk..... 5 00 "
 New milk..... 28 00 "
 Whey..... 3 00 "
 Pasture..... 0 50 per month.

Nursing cow..... 6 00 per month.
 Hay..... 10 00 per ton.
 Straw..... 6 00 "
 Silage..... 3 00 "

The following tabulated statement
 gives the results of the competition:—

BABY BEEF COMPETITION

County	Winner	Breed	Date of Birth	Total cost of feed consumed plus initial value of steer (\$5 00)	Weight of steer	Value	Net profit	Total score on conformation according to score card
				\$ cts.	lbs.	\$ cts.	\$ cts.	
Lambton	R. L. Johnston.....	Shorthorn.	Mar. 4, 1917	56 39	680	102 00	45 61	74
Victoria	Frank W. McKague	Grade Shorthorn	April 22, 1917	103 05	1,250	187 50	84 45	.....
Waterloo	A. D. Ferguson....	Aberdeen Angus	Sept. 15, 1917	144 69	1,100	165 00	20 31	82

NOTE.—The discrepancies in the valuation placed on the same foods used in the different competitions is explained by the cost of these foods which prevailed at the time the respective competitions were commenced.—
Editor.

LIVE STOCK CLUBS

BY H. A. DORRANCE, B.S.A.

IN Dufferin County two live stock clubs have been organized, in both of which keen interest is taken. These consist of a purebred Yorkshire Pig Club and a purebred Shorthorn Calf Club. The objects of these clubs are to create a deeper interest in good live stock; to introduce improved animals; to afford boys and girls training in the care and management of farm animals; and to create if possible greater interest in farm work generally. Membership in the Yorkshire Pig Club is open to farmers' sons between the ages of ten and eighteen years, while membership in the Shorthorn Club is open to both boys and girls of the county between the ages of fourteen and twenty-two. To members of the pig club a pure bred Yorkshire sow, safely in pig, will be provided. These will be paid for by the members at the time of delivery by giving a note for eight months for the amount, endorsed by the parent or guardian to the satisfaction of the manager of the Union Bank, bearing interest at

the rate of six per cent per annum. The members of the Shorthorn Calf Club will be supplied with pure bred Shorthorn heifers, twenty to twenty-four months old, in calf. These will be paid for by giving a note for twelve months, duly endorsed to the satisfaction of the Sterling Bank. The pedigrees of the animals in each case will be registered in the name of the member and all the progeny will become the property of the member. Members are required to feed and care for their animals and when surplus stock is for sale the Department of Agriculture will endeavour to assist in finding a market. Bulletins on the care of the respective animals will be supplied to the members who will be required to keep records of feed, etc., which must be returned to the Department at the end of eight months in case of hogs, and ten months in the case of cattle. At the time of delivery of the animals a charge will be made to cover the premium for an insurance policy during the period of the note.

MANITOBA

FARM ENGINEERING SHORT COURSE

BY L. J. SMITH, B.S., PROFESSOR OF AGRICULTURE ENGINEERING

THE twelfth annual winter course in farm engineering at the Manitoba Agricultural College began on January 14th and ended on the 14th of March. It was quite the best in the history of the institution. It was not possible to accommodate all of the applicants. We had accommodation only for 124, whereas some 60 applicants had to be refused admission. By the employment of extra instructors and assistants we were able to give first rate instruction to the large class of students.

This course is primarily intended to cover farm engineering, although considerable instruction is given in stock judging, grain judging, English and farm bookkeeping. The farm engineering course covers the subjects of gas engine work, steam engines, boilers, forge shop, farm mechanics, concrete construction, building construction, farm machinery and physics. The equipment for the course is housed in the large engineering building of the college. It is U-shaped, has three full stories, a frontage of 160 ft. and is 110 ft. deep. The blacksmith's shop has forty forges and other necessary tools. The concrete laboratory and wood shop have ample appliances and tools. Models and sectional

engines and accessories make it easy for the student to grasp the principles of the important parts of steam and gas engines and boilers. The power machinery laboratory contains four stationary steam engines, together with a dozen gas and steam tractors loaned the college by the various tractor firms. The new stationary gas engine laboratory contains 12 gasoline and kerosene engines kindly loaned us, also equipment for testing the horse power and fuel economy of the engines. In addition, six 4-cylinder high-speed motors have been installed, on angle iron frames, in order to give the student special practice with this type of tractor motor.

Our plan includes the use of at least one evening a week for outside lectures on various subjects allied to the course, such as concrete construction, oils and lubrication, lectures on automobiles, etc. Arrangements are also made for visiting a number of important shops and manufacturing concerns in Winnipeg. By this means students taking the work are given opportunities of acquiring knowledge which is not afforded the ordinary country visitor who may wish to inspect these institutions in Winnipeg.

THE AGRICULTURAL REPRESENTATIVE SERVICE

THE agricultural representative service of the Manitoba Department of Agriculture has been seriously affected by the war. With the return of most of the men who had previously been employed in this service it is again being resumed. The agricultural representative plan in Manitoba is, to some extent, a combination of the American and Canadian plans. The American plan has the Farm Bureau as a central figure, this bureau

selecting the county agent and provides for his salary, office and equipment. The usual Canadian plan, which is exemplified especially in the province of Ontario, provides that the provincial Department of Agriculture shall select and pay the salary and transportation expenses of the Agricultural representative, the county providing an office and furnishing it. The Manitoba plan is briefly as follows:—

1. To have one member of the Extension staff responsible for agricultural representative work.

2. To have an arrangement as to the area to be served by each agricultural representative. (In most cases this area would approximate 25 to 30 miles square).

3. To have in the district, served by each representative, a board of Agriculture consisting of: (1) Community committees, each composed of a chairman and four or five members, each member representing some particular interest in the district; (2) An Agricultural Council composed of the chairman of each community committee, a representative appointed by each Grain Growers' Association, Trustees' Associations, Agricultural Society, Municipal Council, Teachers' Association, Board of Trade, Retail Merchants' Association, Home Economics Society, and any other organization that there may be in the district.

This council meets twice a year for the purpose of discussing the general needs of the community.

To elect from their numbers an Executive committee of nine members who meets with the representative once a month or as often as may be necessary, to discuss the problems needing attention and deciding on the best methods of meeting them.

The Department of Agriculture, in agreement with the Executive committee, engages a representative from among Agricultural College graduates, or others who, though not graduates of an Agricultural College, may be, by training and experience, well fitted for this work.

The chief functions of the Board of Agriculture are:

1. To co-ordinate the efforts of existing agricultural forces.

2. To bring to the agricultural representative the counsel and co-operation of the

best farmers in the district in planning and carrying out an agricultural improvement programme.

3. To provide local machinery in each district for the purpose of quickly and effectively reaching every person living in each community.

4. To develop local leaders in each community.

5. To reveal not only to people living in the district, but to outsiders as well, the agricultural possibilities of the whole district and how they may be realized.

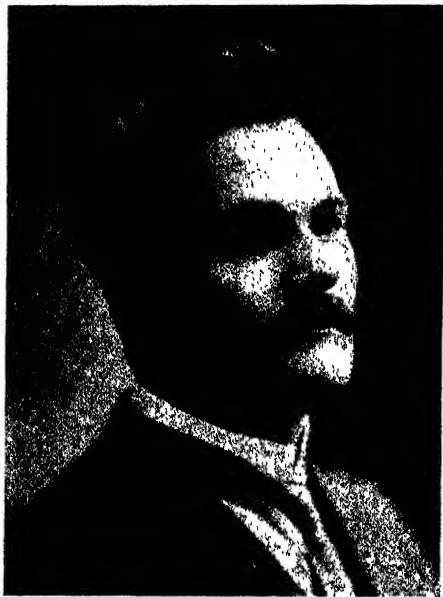
In financing the agricultural representative work the provincial Department of Agriculture and Boards of Agriculture divide the obligation. The Department of Agriculture pays the salary of the representative up to \$1,800 a year; mileage on the use of an automobile up to nine cents a mile; railway fares and living expenses of the representative when away from his headquarters and postage and stationery. The Board of Agriculture provides and furnishes a suitable office; necessary salary above \$1,800 per year and necessary automobile mileage above nine cents a mile and expenses incurred in connection with meetings of the Agricultural Council or executive committee. The representative pays his own living expenses when at headquarters, provides an automobile for his work and suitable housing for it.

✓
"Agriculture will never become permanently prosperous and country life contended until the nation and the states by financial appropriation make sure that the children of the country receive the education that is their right. Farm tenancy and other evils inevitably follow the lack of educational advantages in the open country. The children of the country should receive education equal to that received by the children of the city, with the addition that it should be an inspiration and preparation for farm life.

SASKATCHEWAN

HONOURABLE MR. DUNNING, MINISTER OF AGRICULTURE

THE Hon. Chas. A. Dunning, Provincial Treasurer of Saskatchewan has been appointed Minister of Agriculture, succeeding the Honourable Mr. Motherwell. The Honourable Mr. Dunning



THE HON. CHAS. DUNNING, M.L.A.

is a native of England having been born in Leicestershire in 1885. He arrived in Saskatchewan in 1902 and has farmed since the year following. Mr. Dunning has been closely identified with the Grain Growers' movement. In 1911 he took a prominent part in the organization of the Saskatchewan Cooperative Elevator Company, Limited and was general manager from then until 1916. In 1913 he was appointed Royal Commissioner by the Saskatchewan Provincial Government to investigate the question of agricultural credits and also the marketing of grain in Europe. From 1911 to 1914 he was president of the Saskatchewan Grain Growers' Association and during that time and for two years later he was a member of the executive board of the Canadian Council of Agriculture. In the cabinet of the Saskatchewan Government, Mr. Dunning was made Minister of Railways in 1917, Minister of Telephones in 1918 and was made Minister of Agriculture in February of this year. Last year Mr. Dunning occupied the position of Director of Agricultural Production on the Canada Food Board.

RECENT AGRICULTURAL LEGISLATION

THE following is a summary of the Acts relating to Agriculture passed at the recent session of the Legislature of the Province of Saskatchewan:—

LOANS FOR ELEVATORS

An Act to confirm an Agreement with the Saskatchewan Co-operative Elevator Company, Limited.

This Act sets forth the terms and conditions under which loans are to be made to the company by the Province (1) for the purchase of elevators, and (2) for the building of

elevators. The agreement embodied therein provides for a loan of not more than 85 per cent of the cost, secured by chattel mortgage on buildings, machinery and equipment. As additional security, the company transfers and assigns to the Government the uncalled capital stock of the company subscribed for by the members of the local for whose benefit the elevator is purchased or built. Repayment is to be made in twenty equal annual instalments of principal and interest.

An Act to validate and confirm a certain agreement between His Majesty

and the Saskatchewan Co-operative Creameries, Limited.

The Saskatchewan Co-operative Creameries Act authorizes the government to make a loan to The Saskatchewan Co-operative Creameries, Limited, towards the cost of purchase, construction or remodelling of any creamery, cheese factory or public cold storage warehouse.

The new Act sets forth, in the form of an agreement, the terms and conditions under which loans will be made. In case of purchase a loan to the amount to 75 per cent of the valuation is authorized. Where new buildings are erected the loan may be equivalent to 75 per cent of the estimated cost, including machinery and equipment. In districts colonized by returned soldiers, however, the loan may equal the cost of the cheese factory or creamery.

An Act to validate and confirm a certain Agreement between His Majesty and The Saskatchewan Co-operative Creameries, Limited.

The Agreement validated by this Act sets forth the terms and conditions of a loan of \$70,000 by the Province to The Saskatchewan Creameries, Limited, towards the cost of a public cold-storage warehouse in the City of Saskatoon, estimated at \$115,000 including land, machinery and equipment.

By the Act incorporating the said Company the Government is authorized to loan the Company 75 per cent of the appraised value of any public cold-storage warehouse suitable for the preservation of food products which the Company may acquire or establish. The security is to consist of a first mortgage on the land, or, if the land is leased, of an assignment of the lease supplemented by a chattel mortgage on the buildings and equipment. Cream-buying stations and egg and poultry marketing stations are regarded for the purposes of the Agreement as part of the creamery or cold storage warehouse which they serve. Loans are to be repaid in

twenty equal annual instalments with interest.

An Act to incorporate The Northern Saskatchewan Co-operative Stock Yards, Limited, and An Act to incorporate The Southern Saskatchewan Co-operative Stock Yards, Limited.

These two Acts provide for the incorporation of joint stock companies, one in Northern and the other in Southern Saskatchewan, with power to build and operate stock yards at Prince Albert and Moosejaw respectively. Each company may borrow from the government a sum equal to one-third of the cost of the buildings. Five years' exemption from taxation is granted.

An Act respecting Wolf Bounties.

This Act provides for the payment of a bounty of \$10 for the killing of timber wolves and of \$1 for wolf pups. It is a revision of The Wolf Bounty Act of 1912, and takes its place.

A number of amendments to existing acts were passed. These were: (1) An amendment to *The Act respecting Seed Grain, Fodder and other Relief*; (2) An amendment to *The Municipalities Seed Grain Act 1917*; (3) An amendment to *The Municipal Hail Insurance Act*; (4) An amendment to *The Stray Animals Act*; (5) An amendment to *The Agricultural Societies Act*; (6) An amendment to *The Agricultural Co-operative Associations Act*, and, (7) An amendment to *The Saskatchewan Co-operative Elevator Company Act*.

APPROPRIATIONS FOR AGRICULTURE AND AGRICULTURAL INSTRUCTION

The total vote to be administered by the Department of Agriculture for the fiscal year 1920 amounts to \$193,600 as follows:

Assistance to General Agricultural Interests.....	\$ 63,500
Assistance to Live Stock Industry..	36,300
Assistance to Dairy and Poultry Industry.....	10,700
Publicity and Statistical Work.....	18,200
Weed Control, Seed Inspection and Exhibitions	15,000

Bureau of Labour.....	30,000
Game Protection and Museum..	19,900
Miscellaneous Services	
	<u>\$193,600</u>

DETAILS OF MAJOR SERVICES

Expenditures under Agricultural Societies Act.....	\$60,000
Administration of the Horse Breeders' Act.....	7,000
General Live Stock Industry Services	4,000
Saskatchewan Winter Fair Board	8,000
Assistance to Live Stock Associations	1,800
Destruction of Wolves.....	6,000
Travelling Dairies and General Dairy Services	7,500

For Advancement of Poultry interests.....	1,000
Weed Control Service.....	8,000
To promote use of good seed	1,000
Gopher Destruction.....	2,000
Exhibits at Fairs outside Saskatchewan.....	2,000
To Secure and Distribute Harvest Labourers.....	2,000
	<u>\$110,300</u>

AGRICULTURAL EDUCATION.

Agricultural Extension Work.....	\$30,000
Grants to Districts giving Instruction in Household Science and Manual Training.....	1,800
Domestic Science Scholarships.....	500
	<u>\$32,300</u>

ALBERTA

AGRICULTURAL COURSE FOR RETURNED SOLDIERS

BY E. A. HOWES, B.S.A., DEAN OF COLLEGE OF AGRICULTURE

THE course in agriculture for returned men at the University of Alberta comprises a five months' course in practical work. For this we have 75 men registered. The work for each month is a separate unit, so that a man may enter at the first of any month and carry out his five months' course without special attention or class work. All the non-essentials are eliminated and wherever possible actual practice is given. Inasmuch as the larger classes must attend during the winter months, it is unfortunate that an actual practice on the soil is not possible. However, despite this handicap, every effort is made to render the course as practical as possible.

The subjects of the course cover animal husbandry, field husbandry, horticulture, dairying, carpentry, blacksmithing, poultry raising, farm machinery and veterinary science.

In connection with these courses we have undertaken to seed 3,000 acres to crop this spring and to break 5,000 acres of new land during the summer.

In the animal husbandry course the live stock judging is done in the College pavilion. The aim of this course

is to acquaint the student not only with the types and the market classes of live stock but with the characteristics of the different breeds as well. The work of feeding and management of each of the classes of live stock is given concurrently with the judging classes. The training also consists of the art of feeding and training animals for the show ring, while attention is also given to the study of pedigrees and the relationship of improved blood to successful stock raising.

In field husbandry, seedling and soil management are systematically dealt with. In horticulture, vegetables, floriculture, landscape gardening and fruit growing, and forestry are all covered. Opportunity is given so far as possible to have the students themselves do the work called for in the course under the supervision of their instructor.

In the dairying course recommendation is given to the growing importance of this industry not only in the province of Alberta but in the whole of Canada. The course covers all features of the work from the handling of the dairy herd to the various products of the dairy.

Poultry studies include the breeds and breeding as well as raising, fattening, killing and marketing.

In the carpentry course the men are taught to make simple pieces of equipment and to effect repairs in wood work. The simple principles of building construction are also dealt with.

In the blacksmithing course it is recognized that the "village blacksmith" is becoming almost extinct throughout the country and that farmers must depend on themselves to repair machinery, shoe horses and similar work.

In the veterinary science course the students are taught how to nurse animals and to handle at least the more common diseases due to mistakes in feeding, those common to young animals, unsoundness, contagious ailments, and ordinary surgical operations.

It must be remembered that the College of Agriculture was not equipped for all of this work. An old machine shop was fitted anew and turned into a blacksmith shop equipped with 16 forges, anvil and necessary tools. Two rooms in the engineering building were secured for carpentry work, and equipped with 12 large serviceable benches, each accommodating two men. Part of the dairy equipment was kindly loaned by commercial firms, part had to be purchased. A large greenhouse was added to the existing equipment to give facilities for work in soils, seeds, flowers and vegetables. A room was fitted up for practising seed testing, fanning mill work, and different types of seed treatment. These were extras, of course, added to the existing equipment in field husbandry,

animal husbandry, and horticulture. Some instances of unclassified work are as follows;—

(a) Logs are being procured and training is to be given in "shack" building.

(b) A full demonstration will be given in regard to hog-killing, dressing and packing, all done in such a way as would be carried on at such a farm house.

(c) Demonstrations at the stockyards will be given in dehorning and branding.

(d) At the slaughter houses of the packing plant, condemned carcasses have been reserved and used for class material to show the nature of some of the leading live-stock diseases.

It would not be fair to close this more or less formal statement without expressing a word of appreciation of the regularity, and punctuality of the attendance of this class. Much satisfaction is expressed by all of the teaching staff in regard to the attention and general attitude of the men taking this special course in agriculture.

VOCATIONAL TRAINING

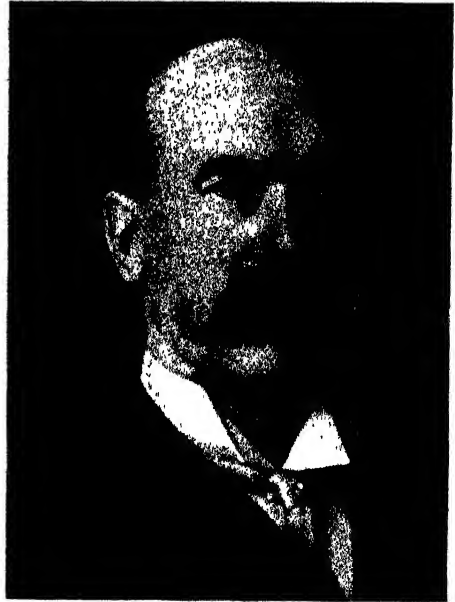
Besides the courses given to returned soldiers at the University of Edmonton a course of vocational training is being carried on at Calgary. This branch of the work has been completely reorganized during the present winter. That course deals chiefly with farm mechanics in which the classes contain about 170 men. Twenty of these are taking the gas engine and tractor course while the others are taking the full farm mechanics course.

BRITISH COLUMBIA

DR. DAVID WARNOCK, DEPUTY MINISTER OF AGRICULTURE

DR. David Warnock, M.R.C.V.S., has been appointed Deputy Minister of Agriculture for British Columbia, succeeding Mr. W. E. Scott, who resigned last year. Dr. Warnock, who is the son of a Lanarkshire Scottish farmer with a national reputation as a breeder of Clydesdale horses, Ayrshire cattle and sheep, came to Canada in 1889. He managed the High River horse ranch from 1889 to 1893, was local manager of the Walrond Ranch during the next ten years and then began business in Pincher Creek as a farmer and veterinary practitioner. He did considerable business in supplying horses to the big lumber companies and coal companies in Alberta and British Columbia. Government work is not entirely new to Dr. Warnock as he was an officer of the Health of Animals Branch of the Federal Department of Agriculture from 1904 to 1909. For the two years commencing in 1911 Dr. Warnock represented the Pincher Creek constituency in the Alberta legislature, and for the next five years was member of the House of Commons for McLeod. Soon after the outbreak of the war Dr. Warnock was appointed by the Imperial Government a member of the

British Remount Commission in which capacity he was attached to the remount station at Lachine, Que. For military services he was last year



DR. DAVID WARNOCK, M.R.C.V.S.

appointed an officer of the Order of the British Empire. Dr. Warnock assumed his new office on the first of April.

HEAD OF HOUSEHOLD SCIENCE BRANCH

THE Department of Agriculture of British Columbia has appointed Miss Olive E. Hayes to take charge of the Household Science branch of the Department. Miss Hayes is a graduate in Household Science of Macdonald Institute, Guelph, Ontario. The services of Miss Hayes will be placed at the

disposal of the women institutes for organization and lecture demonstration work. A four-day demonstration course will be conducted by Miss Hayes at each institute when "milk", "vegetables", "food for the growing child" and "invalid cookery" will be the subjects of the respective days' programmes.

PART III

Junior Agriculture

DEMONSTRATIONS, COMPETITIONS, AND CLASS-ROOM STUDIES IN RURAL
LIFE FOR BOYS AND GIRLS

DISTRIBUTION OF EGGS TO SCHOOL CHILDREN

PRINCE EDWARD ISLAND

BY J. E. MCLARTY, DIRECTOR, RURAL SCIENCE DEPARTMENT, PRINCE OF WALES COLLEGE

DURING the past year we organized Boys' and Girls' Poultry Clubs at several of our school fair centres. The members of each club chose one breed of poultry. In all there were five different breeds chosen, with a decided preference for the Barred Plymouth Rock.

The eggs were supplied by breeders who had selected flocks of the different breeds. The club sent in their order to this Department and we forwarded it to the breeder. The breeder packed and shipped the eggs direct to the club. The Prince Edward Island Egg and Poultry Association loaned us sufficient money to pay for all eggs when ordered. The members of the clubs were given the option of paying for the eggs when received, or, deferring payment till fall. About one half the members paid cash while the others deferred payment till a later date.

All members were asked to fill in a report form. From these reports much valuable information was received regarding the condition of

eggs when delivered, the number of infertile eggs, the number of chickens hatched and the number raised. The following information was obtained from a summary of the reports received from the two clubs having best results:

St. Peters Club, 13 settings, 169 eggs, 108 chickens hatched, 99 raised.

Hillsboro Club, 15 members, 12 of whom reported. From 180 eggs used, 142 chickens were hatched, 86 were raised. A summary of results obtained by the other clubs shows a lower percentage of hatch per setting.

For 1919 it is planned to distribute day-old chickens to club members. A mammoth incubator with a capacity of 2,400 eggs is to be installed and the day-old chicks are to be taken to the schools and handed over to the members. The person in charge of the distribution in this way will be able to give the members a talk on the raising of chickens and thus it is hoped that exceptionally good results may be obtained.

NEW BRUNSWICK

BY A. C. MCCULLOCH, POULTRY SUPERINTENDENT

OUR methods of organization of boys' and girls' clubs and the distribution of eggs to members have been only slightly modified from those of last year, which were dealt with in The Agricultural Gazette for May, 1918, on page 513. This season, instead of supplying eggs only to the members we shall distribute day-old chicks to several of the members to determine the comparative feasibility of this idea and the distribution of eggs. Some of the chicks will be hatched at the Department and others will be shipped direct from the breeders. By the distribution of chickens we hope to be two or three weeks in advance of the times, that is we can ship the chicks to the boys and girls if they have broody hens as early as we can ship the eggs. We found this last year, namely late hatching, to be one of

the most serious handicaps in the successful operation of our Clubs. Twenty-five chickens will be considered equivalent to fifty eggs sent out. We will exact the same returns from them as we did last year, namely four birds in the fall of the year or fifty eggs next spring, or twenty-five day-old chicks next spring.

Eggs and chicks are being obtained from very much the same sources as in 1918, viz. Maine, Ontario and few from Nova Scotia. We also expect to use some of our local product and may possibly be able to get a few from the birds from eggs imported last spring.

Eggs and chicks will be delivered in much the same manner as previously. In some cases we may call on the secretaries of our clubs to make the distribution.

ONTARIO

BY R. S. DUNCAN, B.S.A., SUPERVISOR, AGRICULTURAL REPRESENTATIVES

IN the regulations governing School Fairs for 1919 which were sent out to the Agricultural Representatives of the Ontario Department of Agriculture, there appears the following under the sub-heading "Eggs":—

"Printed directions for hatching will be prepared by this office and distributed upon request. These should accompany eggs. Only three settings of eggs will be allowed each school, except in Northern Ontario where six may be supplied. The pupils to receive same should be decided by vote of the school. Each pupil receiving a setting will pay 25c. to go to the School Fair Association for prize money.

If other pupils desire eggs, you may, upon order from their parents, supply eggs from the same source, provided the price is not more than 75c. per dozen. Expense of delivery will be borne by the Department but the pupils must pay the cost price of the eggs. Birds from these eggs will be eligible for entry at the school fairs.

Schools having more than one room will be treated as separate units for distribution of eggs."

In further explanation let me say that eggs are distributed to pupils in the rural schools which have been organized for school fair purposes by the Agricultural Representatives of the Department. During 1918 this work embraced 307 fairs, in which 2,868 schools were included. A total of 9,940 dozen were distributed which means that on the average from three to four pupils in each school received eggs.

THE SOURCES FROM WHICH THE EGGS
WILL BE PRODUCED

In practically every county and district of the province, from three to five poultry breeding stations have been established to supply the eggs for that district. A certain quantity will have to be procured through the Poultry Department at the Ontario Agricultural College, Guelph. These flocks of Barred Plymouth

Rocks are from a special bred-to-lay strain. The cockerels for these stations are all secured from the Poultry Department of the Agricultural College at Guelph.

Most of these stations have been inspected by Mr. F. N. Marcellus, Field Officer of the Poultry Department and the poor birds have been culled out. A second inspection at which a special culling demonstration will be given is to be made in July and August next.

THE METHOD OF DELIVERY

During the past season the greater

majority of the eggs were distributed by parcel post—which system met with success in all but four or five counties. The poor hatch in these districts can be attributed to carelessness of handling by rural mail carriers. Some of the Representatives distribute the eggs by express along with the seeds to the nearest express office and the school fair director or teacher calls and delivers them to the pupils. In other instances, the eggs are distributed by motor or livery by the representative, direct to the schools.

NOVA SCOTIA

A DEMONSTRATION SCHOOL GARDEN

A SCHOOL garden operated at Annapolis Royal was made a demonstration garden for the neighbourhood. This had reference especially to the spraying of potatoes of which there were twenty-four rows. Rows 1 to 5 were sprayed with dry Bordeaux, 6 to 10 with arsenate of lead, 11 to 14 without spray, 15 to 20, 1-4-40 Bordeaux, 21 to 24, 4-4-40 Bordeaux.

The results of spraying were very marked, and the "patriotic potato patch" was watched by many in-

terested people. Signs were put up next the main road, across the end of the strip, stating the spray used, so that all could see, and judge for themselves. The strip "no spray" had dead-looking tops early in the fall—the last to fade was the 4-4-40 Bordeaux strip. The yield was more than three fold greater in the 4-4-40 strip than in the "no spray." The practical result of spraying was an object lesson to the entire community and if for no other reason was worth while.

ONTARIO

BOYS' AND GIRLS' GARDENING ENCOURAGED

TO encourage gardening among the pupils of the schools of the city of Toronto, the Toronto Horticultural Society, through the immediate attention of Mr. C. B. Hamilton, the second vice-president, has organized a system to encourage gardening at the homes of the pupils of the public schools. The system involves the providing of seeds of garden vegetables including onions, parsnips, beets, etc., to pupils,

at two cents per package, with instructions for the cultivation of each crop. The empty envelope, of which 45,000 have been distributed, constitutes an order from the pupil. This empty envelope is required to be returned to his or her teacher with the amount of money necessary to pay for the seed. The teacher forwards the envelopes with an order sheet for the whole room to the principal of the school who fills out

a complete sheet for the school and returns it to Mr. Hamilton along with the pupils' envelopes. The envelopes are then filled with the packages of seeds desired and returned to the schools to be distributed to the pupils. The front of the envelope constitutes an order sheet, while the

back bears the pupil's name and address, and the school and room to which he belongs, together with a series of exhortations and instructions as well as an announcement that an exhibition of garden produce will be held in each school in September.

AGRICULTURAL TEACHERS' ASSOCIATION

A COUNTY Agricultural Teachers' Association has been formed in Lincoln County, Ontario. It is organized for the teachers in the county who have attended the summer school for teachers at the Ontario Agricultural College and are actively engaged in teaching agriculture in their schools. Other teachers interested in agricultural work are also admitted to the membership of the society. The Association meets on the first Saturday of each month at the office of the agricultural representative in St. Catharines to make

plans for the coming month. This work is all done under the Department of Education. Public school inspectors and other authorities are secured to attend these meetings and assist in the programmes carried out. In the Association there exists a prize list committee. This committee works in co-operation with the agricultural representative in making up the prize lists for the different school fairs in the county. This Association has been very helpful in promoting school fair work.

SASKATCHEWAN

THREE MONTHS' SPECIAL COURSE IN AGRICULTURE AND KINDRED SUBJECTS FOR FARM BOYS

BY A. McDERMOTT, B.S.A., DIRECTOR OF SCHOOL AGRICULTURE

IT has been felt for some time that our schools as at present organized do not fully meet the needs of the (teen) age boy of the province in giving him an education to enable him to get the most out of rural life. The following is an outline of work being carried on at Moosomin designed to meet this need and worked out by the Department of Education in co-operation with the High School Board at the above named centre. Mr. A. M. McDermott, B.S.A., of the Department of Education is in charge. The class opened Jan. 6 with a registration of eight young men. This number has grown to twenty-seven ranging in age from 14 to 57 (an average age of 21). Their

previous education was Grade V to Grade IX.

An attempt is being made as far as time and circumstances permit to give a practical and theoretical course in agriculture and closely correlated subjects, such as arithmetic, civics, business practice, literature, reading and public speaking. Forenoons of each day are given to lecture and theoretical work along above named lines and afternoons to practical work developed from the lecture material.

Besides soil testing, Babcock milk testing, candling of eggs, seed testing and judging and study of weeds and weed seeds, excursions have been made to several of the better farms

within a radius of ten miles of the town.

Grade Shorthorn, Herefords and Oxford sheep, Clydesdale horses, Ayrshire cattle, and Berkshire and Yorkshire swine and poultry have been the objects of study in excursion work to good advantage. Also instructive visits are made to local elevators and gas plants and these studied in their relation to farm life and conveniences.

Invitation to local men has brought several most helpful and instructive addresses from specialists in various lines.

From evidence of added interest and application in the various phases of rural life the course would seem to be an unqualified success which cannot fail to be productive of much good. It is hoped the demonstration at this centre may be a strong incentive to others.

BRITISH COLUMBIA

PRIZES FOR BOYS' AND GIRLS' COMPETITIONS

J. W. GIBSON, M.A., DIRECTOR OF ELEMENTARY AGRICULTURAL EDUCATION

THE question of the character and value of prizes for boys' and girls' competitions is a matter on which there is wide variance of opinion in this province. From the extreme view as expressed by some that cash prizes are the real thing, and the larger the better, on the one hand, to the other extreme, viz: that children should compete for honour as symbolized by a badge or ribbon of some sort, we have all sorts of intermediate views and modifications. There are no rules in force generally throughout the province. It is a matter which rests entirely with the teachers and the school boards.

There are two kinds of school fairs recognized in this province (1) The individual school—where the competition has to do with the growing and exhibiting of certain named crops such as potatoes, beets, cabbage, asters, petunias, etc., or with composite or plot exhibits of several varieties. This applies to children's home gardens as well as to school gardens. (2) The inter-school or group of schools competition for first place in a composite exhibit from the entire school. In these cases a school trophy—a cup or shield—is usually donated by some public-spirited man or by a municipal school board or some organization

in the district. As a rule only schools in the municipality are allowed to compete for such a trophy, which trophy becomes the property of the school first winning it two years in succession.

It is possible to have a one-school competition amongst the individual pupils of the school and then follow with an inter-school or municipal school fair where the competition is amongst schools as such, and not amongst individuals. In the case of the boys' and girls' clubs, however, where all are growing the same kind of crop such as potatoes or corn, or raising the same class of live stock, such as chickens or pigs, there will first be the local competition, after which the winner may compete for the provincial or district sweepstakes.

VALUE AND CHARACTER OF AWARDS OFFERED.

In connection with the boys' and girls' competitions for British Columbia, which comes under the direction of the Department of Agriculture, the prizes for the pig and calf raising competitions are: \$8; \$6.50; \$5; and \$3.50, and for poultry, corn and potato growing and for canning, \$5; \$4; \$3; and \$2.

At the Provincial Seed Fair members of the boys' and girls' clubs

may exhibit corn or potatoes for which the prizes are 1st, \$10; 2nd, \$8; 3rd, \$5. The winners of the provincial or sweepstakes prizes in pigs, calves, poultry and potatoes have each a choice of one of the following: (1) a pure bred pig of breed chosen by the winner; (2) a pen of pure bred chickens of breed chosen by the winner; (3) a special set of agricultural reference books. There is in addition to the above a provincial club prize consisting of a library composed of eight of the best agricultural periodicals which are to be circulated among the club members.

The Department of Education encourages the holding of individual

school fairs where home gardening is carried on, by allowing a maximum grant of \$15 towards the prize list. In connection with inter-school exhibitions a grant of \$5 per school is allowed towards the prize list, up to \$25, as a maximum. These grants are supplemented by school boards and by agricultural or other local societies, as well as by private individuals. Individual cash prizes usually run: \$1.50 for 1st; \$1 for 2nd; and 50c. for 3rd; sometimes a little higher if the contest warrants it. In many cases books are given as prizes but I believe that the majority of the parents and children like best the cash prizes.

If gardens for children are worth while they are worth supporting. The one institution that has been developed for the education of children is the public school. School gardening and home gardening, because they are fundamentally educative, should be supported out of the funds raised for public education. Thousands of school gardens have failed because they have no adequate support. Every city in the country appropriates a number of dollars for each individual child to support instruction in spelling, yet very few cities as yet appropriate as many cents for a child to support school gardening. Yet the more the child learns of the wonderful realities of nature in its garden, the more he feels the pleasure in a growing plant; the more he exults over the beauty of the fragrant flower, the better he can think and the more surely he can learn to spell.

*. In every graded school there should be at least one teacher who is able to teach the sciences and gardening. The equipment and supplies necessary for that work should be supplied directly by the board of education.—*Outdoor Education*.

PART IV

Special Contributions, Reports of Agricultural Organizations, Publications, and Notes.

ASSOCIATIONS AND SOCIETIES

EVENTS OF THE COMING MONTHS

April 2.—Annual meeting Prince Edward Island Stock Breeders' Association, Secretary, W. J. Gibson, Charlottetown, P.E.I.

April 3 to 4.—Shorthorn Conference and Sale, Brandon. Secretaries, J. B. Davidson, Myrtle, Man., H. Follet, Duval, Sask., and A. Meyer, Edmonton, Alta.

April 3 to 5.—Edmonton Spring Show. Secretary, W. J. Stark, Edmonton, Alta.

April 4.—Annual meeting Canadian National Live Stock Records, in Toronto. Secretary, John W. Brant, Ottawa, Ont.

April 7 to 10.—Calgary bull sale. Secretary, E. L. Richardson, Calgary.

FEDERATION OF WOMEN'S INSTITUTES OF CANADA

A Dominion-wide women's organization to be known as the Federation of Women's Institutes of Canada was formed in Winnipeg in February. The new organization constitutes a federation of provincial women's rural organizations known as Women's Institutes, Homemaker's Clubs and Home Economic Societies. The constitution provides that the federation shall consist of three representatives from each province, two of them to be chosen by the provincial convention and the third to be the superintendent for the province, or his or her appointee. A federal convention is to be held once a year and Toronto was chosen as the convention city.

The objects of the Federation of Women's Institutes are to unite the influence of Canadian women to promote educational, moral, social and civic measures, and to bring into communication and co-ordination the various Women's Institutes and like organizations throughout the Dominion; and further, to be a clearing house for institute activities and information, and to outline and encourage nation-wide campaigns in the interest of the whole people, including

homemaking, child welfare, education and community efforts. The organization is to be strictly non-partizan and non-sectarian.

At the organization meeting committees were appointed having the following convenors; Public Health, Dr. Margaret Patterson, Toronto; household economics, Miss A. E. Hill, Macdonald College, Quebec; education and public schools, Mr. George A. Putman, Superintendent of Women's Institutes, Toronto; immigration, Miss E. Cora Hind, Winnipeg; publicity, Mrs. Nellie McClung, Edmonton; legislation, Mrs. Ralph Smith, Vancouver.

The following officers were elected:—President, Mrs. Arthur Murphy, Edmonton; Vice-President, Mrs. Wm. Todd, Orillia, Ont.; Secretary, Mrs. J. F. Price, Calgary, Alta; Treasurer, Miss Eliza Campbell, New Brunswick; directors:—Mrs. H. W. Dayton, of Virden, president of the Manitoba Home Economics Societies; Mrs. F. W. Cameron, of Davidson, Saskatchewan, president of the Homemaker's Clubs of Saskatchewan; and Mrs. Blackwood Wileman, of Duncan, B.C., president of the Women's Institutes of British Columbia.

THE CANADIAN PERCHERON HORSE BREEDERS' ASSOCIATION

The annual meeting of the Canadian Percheron Horse Breeders' Association was held in Calgary on February 12th and 13th. Resolutions were passed urging upon the Minister of Agriculture for Alberta the importance of having Percheron horses of good type represented on demonstration farms of the province; expressing dissatis-

faction with the Stallion Enrolment Board of Alberta; urging upon the Dominion Live Stock Branch encouragement and assistance in improving the character of draft horses produced in Canada and the development of a foreign trade in draft horses. Mr. Wm. H. Wilson, Calgary, Alberta, is Secretary of the Association.

CANADIAN BROWN SWISS ASSOCIATION

The annual meeting of the Canadian Brown Swiss Association was held at Sherbrooke, Que., on February 5th.

The following officers were elected: Hon. president, Arthur Galey, Massawippi, Que.; president, C. E. Standish, Ayer's Cliff, Que.; 1st vice-president, W. A. Jolley,

Waterloo, Que.; 2nd vice-president, Ralph Ballagh, Guelph, Ont.; representatives to National Record Board, J. Keffer, Preston, Ont.; J. M. Laidlaw, Wilton Grove, Ont.; secretary, Ralph H. Libby, Stanstead, Que.

CANADIAN PHYTOPATHOLOGICAL SOCIETY

A Canadian Branch of the American Phytopathological Society has been organized. The purpose of the organization is to bring together all Canadian plant pathologists and keep them acquainted with the work each is doing. In this way it is felt that the interests of agriculture can be advanced. At present the young society has enlisted the foremost pathologists of the Dominion.

Officers for the current year are:—

Professor J. E. Howitt, O.A.C., Guelph, president; Mr. W. A. McCubbin, Dominion Dept. of Agr., St. Catharines, vice-president; Dr. R. E. Stone, O.A.C., Guelph, sec'y.-treas.; Mr. P. A. Murphy, Dominion Dept. of Agr., Charlottetown, P.E.I., councillor; Professor W. P. Fraser, Macdonald College, P.Q., councillor.

THE NATIONAL POULTRY CONFERENCE

A National Poultry Conference, called by the Minister of Agriculture for Canada, was held in Ottawa during three days in February. Duly appointed delegates were present representing Departments of Agriculture and poultry organizations in every province. Officers of the federal Department concerned with the poultry industry were also present. Many important topics relating to the poultry industry were under discussion and the work of the agricultural colleges, poultry associations and federal and provincial Departments of Agriculture were fully discussed. Early in the conference committees were appointed to draft recommendations with regard to the more important subjects to be considered. These matters included the increasing of home consumption, poultry associations and poultry exhibitions, breeding problems, boys' and girls' clubs, diseases, legislation, co-operation and transportation. An organization designated The National Poultry Council was formed and a number of resolutions passed.

NATIONAL POULTRY COUNCIL

A committee appointed to consider the formation of a supreme poultry council brought in the following report which was adopted:—

1. That the provincial associations be formed into a Canadian Poultry Association to be known as "The National Poultry Council" with the object to stimulate, encourage and develop,

- A. The co-operation of all poultry breeders.
- B. The production of all poultry products.
- C. The obtaining of markets.
- D. The encouragement of exportation.
- E. The dissemination of practical information concerning the industry, and all other matters conducive to the advancement of the poultry industry.

2. That the provinces, not now organized, shall without delay form provincial associations embracing all local poultry associations and organizations in their province.

3. That the council shall have power to embrace and to give representation to other national organizations formed to encourage the objects of this association.

4. That the council shall consist of one member from each province.

5. That the council shall be governed by a president, two vice-presidents, one from Manitoba and West and one from Ontario and East, elected from the members of the council and annual convention. A secretary-treasurer or both shall also be appointed at the annual meeting.

6. That this conference shall appoint forthwith a provisional council to hold office until the respective provisional associations have elected their special representative, or until the next annual meeting to be called by and at the expense of the Federal Department of Agriculture and that such council shall elect and appoint the provisional officers of the association.

7. That we further recommend that this conference request the Federal Government to appropriate the sum of \$1,000 for the organization expenses of this association.

8. That the provisional officers shall prepare and submit to the next annual meeting a draft constitution and working by-laws for this association.

9. That the provisional poultry association shall be the association recognized by the provisional department of agriculture as the provincial organization.

The following officers and provincial representatives were appointed:—

OFFICERS

President, Dr. R. Barnes, Health of Animals Branch, Ottawa.

Vice-president for Western Canada, W. Kerr, Brandon, Man.

Vice-president for Eastern Canada, Dr. P. C. Gauthier, St. Louis, P.E.I.

Secretary-treasurer, Ernest Rhoades, Live Stock Branch, Ottawa.

PROVINCIAL REPRESENTATIVES

Prince Edward Island, Dr. P. C. Gauthier, St. Louis; Nova Scotia, H. H. Hull, Glace Bay; New Brunswick, A. C. McCulloch, provincial poultryman, Fredericton; Quebec, A. P. Hillhouse, Foster; Ontario, Dr. Barnes, Ottawa, president Eastern Ontario Poultry Association; Manitoba, W. Kerr, Brandon; Saskatchewan, H. M. Arnaud, Regina; Alberta, C. M. Baker, Calgary; British Columbia, H. E. Waby, Enderby.

PRINCE EDWARD ISLAND DAIRYMEN'S ASSOCIATION

The annual meeting of the Prince Edward Island Dairymen's Association was held at Charlottetown at the end of February. Resolutions were passed covering the following points: Endorsing the action of the three Maritime Provinces in adopting the one dairy school at Truro; calling upon the provincial government to impose a direct educational tax to provide suitable salaries for school

A NATIONAL POULTRY POLICY

The conference adopted a comprehensive policy, that the delegates might keep before them, and advertise through their respective provinces to be to all interested in the poultry industry a constant source of inspiration and a spur to greater effort:—

1. Increased production.
2. Economic production—through stock improvement.
3. Quality payment.
4. Co-operative marketing.
5. Markets intelligence.
6. Standardized product — government inspected and guaranteed.
7. Service in transportation.
8. Perfection in storage.
9. Increased consumption.
10. Advertising and salesmanship in the disposal of the product at home and abroad.

teachers; asking that the law permitting the sale of oleomargarine in Canada be rescinded. One hundred dollars annual fee was voted towards the support of the National Dairy Council.

The following officers were elected: President, Rev. Dr. Gauthier, St. Louis; vice-president, Mr. J. H. Simpson, Bay View; secretary, Mr. J. F. Proffitt, Kensington.

UNITED DAIRYMEN OF NEW BRUNSWICK

An organization named the United Dairymen of New Brunswick has been formed. Its objects are to improve and develop the dairy industry in the province. It is expected that the co-operative purchase of creamery and dairy supplies will be undertaken. The organization is composed of representatives from cheese factories, creameries, milk ship-

pers, and ice cream manufacturers. Messrs. A. E. Trites of Salisbury and W. G. Haggard of Sussex were appointed representatives to the Canadian Dairy Council.

The following officers were elected: F. G. Hughson, Corn Hill; vice-president, A. E. Trites, Salisbury; secretary, H. W. Coleman, Sussex.

THE GENERAL STOCK BREEDERS' ASSOCIATION OF QUEBEC

The annual convention of the General Stock Breeders' Association of the province of Quebec was held in Montreal on February 20th and 21st. The convention was made up of the French Canadian Horse Breeders' Association, the French Canadian Cattle Breeders' Association, the Quebec Sheep Breeders' Association and the Quebec Swine Breeders' Association, which have an aggregate membership of 997. Resolutions were passed requesting a provincial law obliging cheese factories and creameries to pay for milk on the basis of its richness in fat; recommending co-operation with the Department of Agriculture to work out plans for the improvement of live stock and the means to render live stock breeding more profitable.

The following officers were elected: President, Hon. N. Garneau, Quebec; 1st vice-president, Arsene Denis, St. Norbert;

2nd vice-president, Jas. Bryson, Brysonville; secretary, Dr. J. A. Couture, Quebec.

The four affiliated associations elected the following boards of officers:

French-Canadian Cattle Breeders' Association—Arsene Denis, St. Norbert, president; Loyis Thouin, Repentigny, vice-president.

Sheep Breeders' Association—Nap. La-chapelle, St. Paul, president; James Bryson and V. Sylvestre, vice-presidents.

French-Canadian Horse Breeders' Association—Joseph Deland, L'Acadia, honorary president; Victor Sylvestre, St. Hyacinthe, president.

Swine Breeders' Association—M. L. Lavallee, president; Cloirs Ouimet and Frank Bryson, vice-presidents.

Dr. J. A. Couture was elected secretary of all four associations.

QUEBEC MAPLE SUGAR AND SYRUP CO-OPERATIVE ASSOCIATION

The annual convention of the Quebec Maple Sugar and Syrup Co-operative Association was held in Joliette on February 18th. There were about three hundred delegates and maple sugar makers present. It was reported that large quantities of maple sugar and syrup were shipped to England and France during the war period, through the Red Cross. Resolutions were adopted asking the Provincial Government for greater financial assistance in order

to develop the maple sugar industry; urging upon the Dominion Government to be more aggressive in the administration of the Adulteration Act with respect to products sold as maple sugar.

The following officers were elected; President, Gustave Boyer, M.P., Rigaud, Que.; vice-president, Chas. A. Fisk, Abbotsford, Que.; secretary-treasurer, Jos. H. Lefebvre, Waterloo, Que.

QUEBEC DAIRYMEN'S ASSOCIATION

The annual meeting of the Beauharnois District Dairymen's Association of the province of Quebec was held at Howick at the end of February. The district agronomist pointed out the value of co-operative cow-testing associations. A resolution was passed recommending the organization of these by farmers of the district.

The following officers were elected: President, D. H. Brown, Glenelg; vice-president, R. R. Ness, Howick; secretary, W. J. Stephen, Huntingdon; delegate to the National Dairy Council, Jas. C. Winter, Ormstown.

THE ONTARIO CORN GROWERS' ASSOCIATION AND SHOW

BY P. L. FANCHER, CORN SPECIALIST

The eleventh annual Corn Show was held at Chatham, February 11th, 12th, 13th and 14th. The Show was one of the best held in the history of the Corn Growers' Association. The attendance was good, the entries in the senior classes were large, and the quality and uniformity of the exhibits excellent. There were 535 entries in the general classes and nearly 200 in the county classes. In the bushel ear lots the entries were by far the largest on record, being, 32 in the dent class alone.

One of the most notable features was the absence of the numerous varieties of corn not recognized as standard varieties in Ontario. The Corn Show has weeded out the unprofitable varieties and strains, more by the process of selection and breeding carried on by its members and by the Canadian Seed Growers' Association. There are now practically only two flint varieties shown to any extent. They are, Longfellow and Salzers North Dakota. Among the dent classes, White Cap Yellow Dent, Wisconsin No. 7, and Bailey lead this year. All varieties exhibited this year show clearly the work of the Association. There was uniformity both in the sample exhibited and in type of variety. There is still work to be done in regard to variety and type. This is required most in the Golden Glow, Wisconsin No. 7 and Bailey. Each of these varieties show slight differences in strains.

The fact that there is a very small percentage of other corn planted for husking purposes in the southwestern part of Ontario, other than those varieties taking the leading place in our Corn Show, is a self-evident fact of the value of the work of this organization in the production of

seed in the southwestern part of Ontario. It has also bred into our corn a uniformity that commends itself to the grower of ensilage in the East.

The grains and small seeds had the largest number of exhibits this year that have ever been shown. It is gratifying to see the advancement made in the matter of showing grains and seeds almost free from any noxious weeds. In the 97 entries that were shown this year only a few contained any bad weeds. Clovers and timothy were almost wholly free.

The afternoon lectures have always been made an outstanding feature in connection with the Corn Show. This year was no exception, except that it might be said that our lectures were better than usual. Prof. L. C. Burnett, of Ames, Iowa, who was the senior judge of corn, was one of the chief speakers and emphasized the value of breeding and selecting corn for production and the recognition of such in the judging at our corn shows. Dr. Creelman, President of the Ontario Agricultural College, opened the Show. Dr. C. A. Zavitz of the Ontario Agricultural College took up the importance of pasture crops for the next season, and Prof. Wade Toole spoke on "Improvement of Live Stock on the Farms of Ontario". All meetings were well attended.

At the annual meeting of the Corn Growers' Association, a standard for Wisconsin No. 7, which originally was 8½ inches to 9½ inches in length and 7 inches to 7½ inches in circumference, was reduced in length to 8 inches to 9 inches and in circumference to 6½ inches to 7½ inches.

A keen discussion arose regarding American corn being imported and sold without being labelled as such, which was considered

detrimental to both the western and eastern corn growers. In consideration of such, a motion was passed that no corn should be sold in Canada for seed purposes unless that corn be labelled American-grown or Canadian-grown corn, and that the secretary of the O.C.G.A. be instructed to use whatever means he finds necessary to carry this out.

An agitation for a winter fair which has existed for some years, culminated this year in the appointment of a committee representing the O.C.G.A., the provincial fair board, and the stockmen of Western

Ontario, to take up the matter and report at the next directors' meeting.

A resolution was also passed that the Association, "believing that the daylight saving scheme was detrimental to the best interest of agriculture, go on record as a protest against its re-enactment in 1919".

The officers for the coming year are: Hon. President, R. W. Knister, Blenheim; president, L. Gregory, Chatham; 1st vice-president, W. A. Anderson, Amherstburg; 2nd vice-president, Stewart McDonald, Pt. Lambton; secretary, P. L. Fancher, Chatham.

ONTARIO POULTRY IMPROVEMENT ASSOCIATION

BY. J. W. CLARK, PRESIDENT

About the middle of January there was formed in the city of Brantford an organization designated The Ontario Poultry Improvement Association. The movement has behind it leading poultry men interested not only in the fancy breeds, but also general farmers, poultry specialists, and backyard poultry keepers. Membership will be divided into three grades attainable at a fee of \$2. The membership is divided according to the quality of stock the member keeps:—

Grade I—Owners of pedigreed poultry and those who trapnest their birds 365 days of the year.

Grade II—Owners of record hens from pedigreed parentage, commencing to trapnest 365 days per year.

Grade III—Users of pedigreed males, who trapnest only in the winter or not at all.

Members of Grades II and III will be eligible for Grade I upon the completion of one year's trapnesting when able to give egg records covering two generations.

The objects of the Poultry Improvement Association are to promote and encourage more poultry of better laying strains, to encourage trapnesting the whole year round, to ask for official records of performance by our Government much the same as is being done in dairy cattle.

We believe that where any party will agree to trapnest at least 25 birds or more for 365 days, they should have protection against many who only use the trap nests

for two or three months and base their records for the year on the results of this short period. After considerable investigation the facts were brought out that a considerable number of people were advertising and selling breeding stock and eggs, which they claimed had records of from 250 to 280 per year, that had never seen a trap nest.

The Association claims that this is unfair competition and that the public are being misled, and as it is a well known fact that egg production is distributed largely through the male, and that many farmers have the pedigree layers sent out by our Department of Agriculture at the Ontario Agricultural College as well as a few other reliable breeders, and that many males are purchased from unreliable sources and are undoing what reliable breeders are trying to improve. It believes that the public should have some protection so that they will be able to get breeding stock having reliable records.

We believe that when many of these breeding stations are in operation they will serve as object lessons to the surrounding community, as each owner will strive to make the best records possible during the season. In doing so increased production will be stimulated in the district. We also wish the Department to select and mark "approved" all stock offered for sale so as to prevent birds lacking in constitutional vigour from being sold.

ONTARIO BEEKEEPERS' ASSOCIATION

The annual meeting of the Ontario Beekeepers' Association was held in Toronto on February 4, 5 and 6. Professor B. N. Gates, the recently elected provincial apiarist, gave an illustrated lecture on the beekeeping industry.

The following officers were elected: President, James Armstrong, Selkirk; 1st vice-president, W. W. Webster, Little Britain; 2nd vice-president, A. McTavish, Carleton Place; secretary-treasurer, Dr. B. N. Gates, Guelph.

ONTARIO HORTICULTURAL ASSOCIATION

The annual meeting of the Ontario Horticultural Association was held in Toronto on February 5, 6 and 7. In addition to the question of the selection of a national

flower and the establishment of children's peace parks, dealt with in the March number of THE GAZETTE, some other matters of importance were voted upon. The Daylight

Saving Act of 1918 was approved and the resolution to this effect was ordered to be forwarded to the Minister of Agriculture at Ottawa. It was resolved that the Ontario Horticultural Societies Act should be amended to provide for the election of ten directors instead of nine, five to be elected for two years and five for one year and thereafter five for two years annually. A resolution was unanimously supported asking the

Dominion Government to set aside an endowment fund for the purpose of providing in perpetuity decoration of the soldiers' graves in England, France, and Flanders with flowers and other plants.

The following officers were elected:— President, Wm. Hartry, Seaforth; 1st vice-president, G. H. M. Baker, Lindsay; 2nd vice-president, Miss Mary Yates, Port Credit; secretary, J. Lockie Wilson, Toronto.

ONTARIO FAIRS ASSOCIATION

The annual meeting of the Ontario Fairs Association was held in Toronto on February 13 and 14. Questions on the standardization of farm machinery, the improvement of live stock, and field crops were fully discussed.

The following officers were elected:— President, L. J. C. Bull, Brampton; 1st vice-president, W. J. Connelly, Cobden; 2nd vice-president, John Farrell, Forest; secretary, J. Lockie Wilson, Department of Agriculture, Toronto.

ONTARIO FRUIT GROWERS' ASSOCIATION

The annual meeting of the Ontario Fruit Growers' Association was held in Toronto on February 18 and 19. It was reported at the meeting that last year 2,500 girls from towns and cities worked on upwards of 1,200 fruit farms.

The following officers were elected. — President, J. E. Johnston, Simcoe; vice-president, C. R. Terry, Clarkson; secretary, P. W. Hodgetts, Department of Agriculture, Toronto.

THE ONTARIO FARM DRAINAGE ASSOCIATION

The annual meeting of the Farm Drainage Association was held in London in February. A programme covering the needs and methods of land drainage was carried out. A resolution was passed asking that the value of tractor ditching machines admitted duty free

be raised from three thousand to six thousand dollars.

The following officers were elected: President, S. W. Hyatt, Mount Bridges; 1st vice-president, I. MacFarlane, Thorndale; 2nd vice-president, J. E. Jackson, Toronto; secretary, F. Ferguson, Chatham.

THE ONTARIO WINTER FAIR

At the annual meeting of the Ontario Provincial Winter Fair board of directors the following officers were elected: President,

J. D. Flutt, Hamilton; vice-president, John Gardhouse, Weston; secretary, R. W. Wade, Department of Agriculture, Toronto.

MANITOBA FARM CONGRESS

The Manitoba Farm Congress was held in Winnipeg from February 17 to 21 inclusive, 1919. The Congress was made up of conventions of agricultural societies, home economic societies, the Manitoba branch of the Canadian Seed Growers' Association, the Dairy Association, the Horticultural and Forestry Association, the Veterinary Association, the Beekeepers' Association and the Boys' and Girls' Clubs. There was in progress during the week a National Soil Products Exhibition. While the meetings of several of the organizations were going on simultaneously, the members were brought together for the noon luncheons and an evening banquet.

BOYS' AND GIRLS' CLUBS.

The Boys' and Girls' Clubs' Convention was largely the result of special prizes donated by various agencies in the spring of 1918. Delegates to the convention consisted largely of winners in the respective competitions. The Manitoba Swine Breeders' Association offered a free trip to Winnipeg to the boy or girl who raised the best pair of pigs in each inspectorial division. The Canadian Bank of Commerce provided a similar prize for the boy or girl who raised the best pair of pigs wherever the bank manager was the manager of a club. The T. Eaton Co. made a similar offer to the boy or girl in

each inspectoral division who made the best showing in raising poultry and vegetables. Through these awards the railway expenses of the children as well as theatre tickets for two entertainments, were provided. The Provincial Department of Agriculture provided their rooms and board. This convention occupied one day. The forenoon was occupied chiefly with reports and addresses from leaders of the various clubs. In the afternoon session the winners from the different districts of the province gave accounts of their work during the year. The sessions were marked by great enthusiasm and earnestness. A visit was paid to the Agricultural College and other places of interest.

THE AGRICULTURAL SOCIETIES.

Delegates to the Agricultural Societies' convention represented sixty-eight associations in the province, with a membership of approximately 9,000. The meeting occupied three days. Resolutions were passed touching the following points: Disapproval of daylight saving legislation; a request that the Department of Agriculture hold a judges' conference; requesting a fixed price for the 1919 wheat crop; requesting legislation to standardize removable parts of farm machinery, requesting the Department of Agriculture to define a standard for judging vegetables; approving the action of the Department of Agriculture in placing stocker cattle throughout the province; demanding the providing of a suitable building for the Manitoba Soil Products Exhibition in future years.

The following advisory board was elected: A. D. McConnell, Hamiota, Chairman; W. H. Dayton, Virden, S. R., Henderson, Kildonan; S. Larcombe, Birtle; Dr. M. C. Rumball, Morden; C. A. Bailey, Elgin, secretary.

MANITOBA DAIRYMEN'S ASSOCIATION.

The Manitoba Dairy Convention extended from February 18 to 21. A butter exhibition was held in conjunction and served to demonstrate the value of the improved methods practiced in the province. Resolutions were passed including the recommendation of the adoption of the standard set by the Dominion Dairy Conference for grading cream; pledging the support of the Association to the aims and objects of the National Dairy Council. The report of the secretary showed that the province produced 8,450,132 pounds of creamery butter, 9,703,337 pounds of dairy butter, and 973,612 pounds of cheese. Forty-two creameries were reported to be in operation.

The following officers were elected:—President, Alex. McKay, Winnipeg; vice-president, James Stainton, Winnipeg; secretary, L. A. Gibson, Department of Agriculture, Winnipeg.

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THE MANITOBA BEEKEEPERS' ASSOCIATION.

At the tenth annual convention of the Manitoba Beekeepers' Association a resolution was passed strongly urging the provincial government to license all beekeepers in the province. The purpose of this resolution was to protect apiaries from American foul brood. Owing to heavy winter losses in 1917-18, considerable time was taken in discussing winter protection. A double-walled hive was recommended.

The following officers were elected: President, G. G. Gunn, Lockport, vice-president, John Dickson, East Kildonan; secretary, R. M. Muckle, Department of Agriculture, Winnipeg.

THE MANITOBA BRANCH—CANADIAN SEED GROWERS' ASSOCIATION

The Manitoba Branch of the Canadian Seed Growers' Association held their annual meeting on February 18th. Dr. Charles E. Saunders, Dominion Cerealist reviewed his work in bringing out new varieties and laid down a minimum test of five or six years at the Experiment Stations before a new variety should be distributed to the public. It takes about this length of time with unrelenting selection to secure fixed character in a new variety.

The following officers were elected.—President, Prof. T. H. Harrison, Manitoba Agricultural College; vice-president, W. C. McKillican, Superintendent, Brandon Experimental Farm; secretary, W. T. G. Weiner, Manitoba Agricultural College.

MANITOBA HOME ECONOMICS CONVENTION

The annual convention of the Manitoba Home Economics Society was held in Winnipeg on February 17th to 21st. On resolution it was decided to change the name of the organization to Manitoba Women's Institutes. An important feature of the convention was a series of addresses from representatives of sister organizations from other provinces who had come to Winnipeg to organize the Federation of Women's Institutes.

The following Advisory Board was elected:—Mrs. H. M. Speechley, Winnipeg; Mrs. D. Watt, Birtle; Mrs. McQuay, Valley River; Miss A. Playfair, Hartney; Mrs. G. T. Armstrong, Manitou; Mrs. K. Gair, Portage la Prairie.

THE MANITOBA HORTICULTURAL AND FORESTRY ASSOCIATION.

The annual meeting of the Manitoba Horticultural and Forestry Association was held in Winnipeg on February 20 and 21 at which the following resolutions were passed:—That the Association endorse the selection of the *Caquilegia* as a national

flower for Canada recommended by the special committee appointed last year; endorsing the proposal to plant trees in prominent public places in memory of fallen soldiers, and the appointment of a committee to co-operate with other organizations in this work; that the Provincial Department of Agriculture be requested to encourage original work in plant breeding, such as producing new and improved varieties of fruits, vegetables and flowers, by offering attractive prizes to successful experimenters.

The following officers were elected:—President, George Batho, Winnipeg; 1st vice-president, H. W. Watson, Winnipeg; 2nd vice-president, W. J. Boughen, Valley River; secretary-treasurer, F. W. Brodrick, Manitoba Agricultural College, Winnipeg.

TYPES OF POTATOES.

A period of the convention was given to a Potato Conference, at which was urged the adoption of certain fixed types of potatoes suitable for growing in Manitoba. At this conference resolutions were passed covering the following points:—That the following four types be selected, the adoption of which is recommended to potato growers, agricultural societies, horticultural societies, and boys' and girls' clubs:—1. Early Ohio Type, 2. Irish Cobbler Type. 3. Early Bovee or Beauty of Hebron Type. 4. A main crop after the Green Mountain type.

Following is a description of these above types:—

Group 1.—Early Ohio.

Tubers: Round, oblong, or ovoid; skin flesh-coloured or light pink, with numerous small, raised russet dots.

Sprouts: Base, leaf scales, and tips more or less deeply suffused with carmine-lilac to violet-lilac or magenta.

Flowers: White.

Varieties: Early Ohio, Early Market, Early Six Weeks, White Ohio, Ohio Junior.

Group 2.—Cobbler.

Tubers: roundish; skin creamy white.

Sprouts: Base, leaf scales, and tips slightly or distinctly tinged with reddish violet or magenta. In many cases the colour is absent.

Flowers: Light rose-purple; under intense heat may be almost white.

Varieties: Early Petosky; Extra-early Eureka, Irish Cobbler.

Group 3.—Hebron or Bovee.

Tubers: Elongated, somewhat flattened, sometimes spindle-shaped; skin creamy white, more or less clouded with flesh colour or light pink.

Sprouts: Base creamy white to light lilac; leaf scales and tips pure mauve to magenta, but colour sometimes absent.

Flowers: White.

Varieties: Country Gentleman, Crown Jewel, Early Beauty of Hebron, Early Bovee, Gem of Aroostock, Harbinger, Late Beauty of Hebron, New Queen, Quick Crop, White Elephant, Morgan Seedling.

Group 4.—Green Mountain.

Tubers: Moderately to distinctly oblong, usually broad, flattened; Skin a dull creamy or light russet colour, frequently having russet-brown splashes toward the seed end.

Sprouts: Section 1, base, leaf scales, and tips creamy white; Section 2, base usually white, occasionally tinged with magenta, leaf scales and tips tinged with lilac to magenta.

Flowers: White.

THE SOIL PRODUCTS EXHIBITION.

The Soil Products Exhibition was regarded as the most complete show of grains, grasses, and vegetables that has been displayed at any time in Western Canada. Sections were provided for the various classes of wheat, oats, barley, peas, and other grains by districts in the province. Although entries were open to the British Empire the exhibits were almost entirely produced in the province of Manitoba. Judging was done by Dr. Charles Saunders, Dominion Cerealist, and Mr. John Bracken, Professor of Field Husbandry, Saskatchewan Agricultural College. Mr. S. Larcombe of Birtle won the wheat championship on Marquis. The Governor-General's trophy for the best collective exhibit of wheat, oats, and barley, or rye or flax was won by Mr. F. E. Young, Oak Lake.

THE MANITOBA VETERINARY ASSOCIATION.

At the annual meeting of the Manitoba Veterinary Association, which was held in Winnipeg on February 19, the following officers were elected: President, Dr. J. A. Swanson, Manitou; vice-president, Dr. J. A. Munn, Carman; secretary-treasurer and registrar, Dr. J. B. Still, Winnipeg.

SASKATCHEWAN DAIRY ASSOCIATION

The tenth annual convention of the Saskatchewan Dairy Association was held in at Saskatoon, February 12, 13, 14. In previous years the dairymen have met conjunction with the agricultural societies and live stock associations. There was

a larger and more regular attendance at the various sessions than formerly and a splendid interest shown throughout. Reports submitted showed the dairy industry of the province to be in a very thriving condition. The creamery output for 1918 was 5,025,038

pounds. This is an increase of 804,279 pounds or 19.05 per cent over 1917.

Representatives were present from the other Prairie Provinces, also from Ontario and British Columbia, and excellent addresses were delivered on questions of production, manufacture, and marketing.

An important feature in the work of this year's convention was the decision to re-organize the provincial association and the adoption of a new constitution to unite all branches into one strong organization to look after the common interests of all who are engaged in the dairy industry.

Representatives were appointed and the fullest support of the Association promised to the newly formed National Dairy Council, the establishment of which was explained in detail.

Prizes were awarded at the convention in nine different competitions conducted by the Association. These included, in addition to prizes for creamery butter-making and butter judging, an Ideal Creamery

Competition where awards totalling \$130 made on a score of creamery, equipment, and surrounding grounds; a Greater Average Production Competition where \$125 was distributed in five prizes to owners of herds delivering the greatest amount of butter fat per cow to any creamery within the province, and a Boys' Dairy Cattle Judging Competition.

Resolutions were passed asking for the rescinding of the order permitting the manufacture and sale of oleomargarine in Canada; petitioning the federal government to permit the importation of dairy machinery used in pasteurization free of customs duties; urging that contestants in the greater average production competition be confined to dairymen whose herds are being regularly tested in the Record of Performance.

The officers elected were: President, J. C. Moore, Fiske; vice-president, F. M. Logan, Regina; sec.-treas., P. E. Reed, Department of Agriculture, Regina.

WESTERN CANADA DAIRYMEN'S ASSOCIATION

There has been formed, with headquarters at Moosejaw, the Western Canada Dairymen's Association, the objects of which are to deal with matters directly concerning creamery operators by encouraging the adoption of uniform standards of cream grading and butter grading, and to assist the weaker creameries if necessary in marketing their butter. The activities of the organization will be confined to problems affecting the West only. Matters of a national character

that come up will be submitted to the National Dairy Council.

The following officers were elected: President, F. M. Logan, Regina; secretary, J. A. Caulder, Moosejaw; Directors: Manitoba—J. M. Carruthers, Winnipeg; Ed. Fotheringham, Brandon; Saskatchewan—J. M. Logan, Regina; J. A. Caulder, Moosejaw; Alberta—P. Pallesen, Calgary; W. W. Prevey, Edmonton; British Columbia—Geo. Clarke, Vancouver.

ALBERTA DAIRYMEN'S ASSOCIATION

A provincial dairymen's association has been formed in the province of Alberta corresponding in a general way with the dairy associations in other provinces of Canada. The constitution enumerates the following objects to be sought:

(a) By analysing proposed legislation both provincial and federal and assist in obtaining such legislation as will be beneficial to the dairy industry.

(b) By emphasizing through provincial co-operation the importance of the industry.

(c) By the holding of meetings, the distribution of literature, and by systematic advertising, inform the general public in regard to the food value of dairy products.

(d) By encouraging production, uniform standards of grading, and by co-operation in marketing assist in developing a better trade for Alberta dairy products.

(e) By forming from time to time sections representing specific interests within the province of this organization, provided however this Association ap-

proves the forming of said sections. And this Association here empowers said sections duly formed, to draw up and pass constitution and bylaws necessary to the conduct of it's duties.

At the convention held in Calgary at the end of February resolutions touching the following points were adopted: Recommending the abolition of trade in oleomargarine in Canada; asking the Federal Department of Agriculture to establish the system of grades and grading to conform as nearly as practicable to the system now in force with creamery butter; requesting the provincial government to enact legislation that will safeguard the interests of milk and cream producers in obtaining full weight and value for the milk or cream supplied to creameries and milk buying stations; asking the Department of Agriculture to standardize the method of determining the acidity of milk and cream to be used in all milk and cream stations in Alberta; asking that authority be secured from the Federal Government to inspect and adjust the cream testing scales in Alberta;

that federal standards for dairy products be recognized and adopted by all municipalities engaged in food inspection.

The following officers were elected: Presi-

dent, D. Morkeberg, Markerville; vice-president, P. Pallesen, Calgary; secretary, E. T. Love, Edmonton.

ALBERTA PROVINCIAL CATTLE BREEDERS' ASSOCIATION

At the annual meeting of the Alberta Provincial Cattle Breeders' Association a resolution was passed calling upon the Minister of Agriculture for the province to introduce legislation to prevent bulls running at large.

The following officers were elected:—President, Angus McDonnell, St. Albert; vice-president, W. H. Wallace, Viking; secretary, W. J. Stark, Edmonton.

ALBERTA PROVINCIAL HORSE BREEDERS' ASSOCIATION

At the annual meeting of the Alberta Provincial Horse Breeders' Association held in Edmonton early in March, the constitution was modified providing for the election of a board of directors by the association and the selection of the officers later by the board itself. Mr. G. H. Cresswell, Edmonton,

was elected President; Mr. Lawrence Rye, St. Albert, vice-president, and Mr. W. J. Stark, Edmonton, secretary. It was decided to petition the provincial government to refuse enrolment to grade stallions and those that are hopelessly unsound at the next inspection.

ALBERTA PROVINCIAL SHEEP BREEDERS' ASSOCIATION

At the annual meeting of the Alberta Provincial Sheep Breeders' Association held at Edmonton, it was suggested that inducements should be offered for the establishment of a woollen mill in Alberta in order to provide a home market for wool. A resolution was passed asking the government to extend the bounty on coyotes to male pups

as well as females. The Association endorsed the view of the Canadian Co-operative Wool Growers' Association with regard to the standardizing of the grades of wool.

The following officers were elected:—President, A. B. Campbell, Edmonton; vice-president, Geo. Ball, West Salisbury; secretary, W. J. Stark, Edmonton.

ALBERTA PROVINCIAL SWINE BREEDERS' ASSOCIATION

The annual meeting of the Alberta Provincial Swine Breeders' Association was held at Edmonton on March 6th. Professor A. A. Dowell of the University of Alberta announced the results of experiments in wintering brood sows, in which it was shown that lack of sunlight, forcing the sows to eat snow, lack of exercise, feeding frozen

wheat or too much barley were some of the reasons advanced as causes of weak litters and hairless pigs.

The following officers were elected:—President, G. R. Ball, Edmonton; vice-president, A. R. Gillies, Clover Bar; secretary, W. J. Stark, Edmonton.

BRITISH COLUMBIA GOAT BREEDERS' ASSOCIATION

At the annual meeting of the British Columbia Goat Breeders' Association held at Vancouver a movement was set on foot to begin Record of Performance testing on pure-bred milch goats. It was announced that inspection in connection with this work would be commenced by the Dominion Live

Stock Branch as soon as there was a sufficient number of pure-bred milch goats to justify the work being undertaken.

The following officers were elected:—President, Dr. S. Ransom, Jubilee; vice-president, G. H. S. Cowell, Port Alberni; secretary-treasurer, Geo. Pilmer, Victoria.

NEW PUBLICATIONS

DOMINION DEPARTMENT OF AGRICULTURE

Report of The Agricultural Instruction Act, 1917-18.—In a volume of sixty pages the work accomplished by the provinces with funds provided under The Agricultural Instruction Act is reviewed by subjects, entitled "The Agricultural Representative System", "Co-operation in Marketing", "Investigation", "Women's Work", "Elementary Agricultural Education", "Junior Extension Work", "Agricultural Schools" and "Short Courses".

THE CANADA FOOD BOARD.

The Report of the Canada Food Board for 1918 includes not only the accomplishments of the Board during the year, but in addition a brief review of the preliminary work under the guidance of the Food Controller. It is divided into three parts, the first being general, the second, sectional, and the third, appendices.

THE EXPERIMENTAL FARMS

Circular No. 16 by Dr. Chas. E. Saunders, B.A., Dominion Cerealists, contains a list of the choice of varieties of grains and presents conclusions drawn from the tests which have been conducted on the various Dominion Experimental Farms and Stations for many years.

Pamphlet No. 20, deals with some varieties of tobacco recommended for the province of Quebec among those which have been successful grown.

Pamphlet No. 21, describes the construction and care of tobacco seed beds in the province of Quebec.

Asparagus Culture.—The culture of asparagus, celery, and onions constitutes the text of Pamphlet No. 24 of the Central Experimental Farm by W. T. Macoun, Dominion Horticulturist.

Pamphlet No. 22.—In Pamphlet No. 22 of the Central Experimental Farm Mr. W. T. Macoun, Dominion Horticulturist, deals with the culture of tomatoes and mushrooms and gives the method of forcing rhubarb in the winter season.

DAIRY AND COLD STORAGE BRANCH

A verbatim report of the Dominion Dairy Conference held at Ottawa on November 25 to 28, 1918, constitutes a volume of one hundred and seven pages. Practically all phases of dairy production were dealt with and the International Dairy Council formed.

ENTOMOLOGICAL BRANCH

The Apple Bud-Moths and Their Control in Nova Scotia—by C. E. Sanders, Field Officer and A. G. Dustan, Assistant, consti-

tutes Bulletin No. 16. It is estimated that the bud-moths are probably the cause of more loss in the apple orchards in Nova Scotia than all of the other insect enemies combined. This bulletin is helpfully illustrated.

The Fruit Worms of the Apple in Nova Scotia—is the title of Bulletin No. 17. It is written by G. E. Sanders, Field Officer and A. G. Dustan, Assistant. As a result of an investigation by these officers it was disclosed that there are no less than nine species of fruit worms which feed on apple foliage and fruit, and the adults of eight other species were discovered in apple orchards. The bulletin describes these insects and gives the full history of each. The insects themselves and the damage they accomplish are represented by illustrations.

PROVINCIAL DEPARTMENTS OF AGRICULTURE

QUEBEC

Report of the Minister of Agriculture.—The report of the work of the Department of Agriculture of the province of Quebec for the year 1918 includes not only accounts of the different divisions of the department but also of the agricultural schools, the dairy schools, Montreal Veterinary College and the household science work carried on at the various institutions of instruction throughout the province.

Directory of Poultry Breeders, Bulletin No. 35 of the Department of Agriculture of Quebec contains a list of breeders of poultry in the province. The following varieties are included: Plymouth Rock, Wyandotte, Rhode Island Red, Minorca, Orphington, Rhode Island White, Chanticleer, Leghorn, Polish, Hamburg, Faverolle, Campine, Buttercups, Dorking, Cornish, Red Cap, Sussex, Brahmans and Cochins. Varieties of turkeys, geese, ducks, rabbits and guinea pigs are also included.

Nature Study Lessons, in two volumes, by D. W. Hamilton, Ph.D., Lecturer in Nature Study and Agriculture at the School for Teachers, Macdonald College, constitutes a teachers' manual containing seasonable topics on nature study and elementary agriculture for the various periods of the school year.

MANITOBA

The Report of the Manitoba Horticultural and Forestry Association for 1918 constitutes Vol. 5 of the "Manitoba Horticulturist", a monthly publication issued by the association.

Crop Bulletin No. 97. A report of the crop, live stock, etc., of the province of Manitoba, is made up of returns received directly from more than 17,000 farmers and a staff of crop correspondents of the Department resident in every district of the province.

SASKATCHEWAN

Report of the Live Stock Commission of the Province of Saskatchewan. In a volume of 92 pages the commission appointed by Order in Council of November 25, 1915, to inquire into and investigate the marketing of live stock and live stock products of the province, issues a final report of their findings.

The Thirteenth Annual Report of the Department of Agriculture.—In a volume of 298 pages the reports of the Deputy Minister and the various commissioners for the year ending April 30, 1918 are recorded.

BRITISH COLUMBIA

The initial number of a series of bulletins to be published by the British Columbia Fruit Growers' Association, has appeared. It is designed to keep the members in active touch with the executive, work and policies of the Association.

MISCELLANEOUS

The Annual Report of the Lethbridge Board of Trade for 1918 reviews not only the general business of Lethbridge, but of the surrounding country, devoting considerable space to dry farming, irrigation farming, live stock, water supplies, and agricultural welfare generally.

Our National Forests.—In this volume of two hundred and thirty-eight pages published by the Macmillan Company of Canada, Richard E. D. Boerker deals with the vast national resources found in the national forests which cover more than one hundred and fifty-five million acres. Statistics as to

these resources are given. The text largely constitutes information taken from official sources. The publication is rich in illustration.

Canadian National Live Stock Records.—The following stud and herd books of the Canadian National Live Stock Records have recently been issued each containing a list of the officers, the constitution and by-laws governing the respective organizations, and the pedigree numbers as follows:

Clydesdale Stud Book of Canada, Volume 26, contains pedigrees of stallions numbering 18,573 to 19,878 and of mares 37,744 to 40,229.

Canadian Pony Stud Book, Volume I, contains pedigrees for Shetland stallions numbering 1 to 203 and of mares 1 to 692; Welsh stallions numbering 1 to 33 and of mares 1 to 112 and 1 Polo stallion.

Canadian Jersey Cattle Club Record, Volume III, contains pedigrees of males and females numbering 6,011 to 9,099.

Canadian Aberdeen Angus Herd Book, Volume IV, contains pedigrees of males and females numbering 8,711 to 13,600.

Canadian Hereford Herd Book, Volume I, contains pedigrees of males and females numbering 19,151 to 28,800.

Dominion Shorthorn Herd Book, Volume 34, contains pedigrees of bulls numbering 109,866 to 117,694 and of cows 124,361 to 133,565.

Canadian Ayrshire Herd Book, Volume 27, contains pedigrees of males and females numbering 53,026 to 57,500.

Canadian Kennel Club Book, Volume 20, contains pedigrees of males and females numbering 15,982 to 17,873 which includes 42 breeds of dogs.

NOTES

The Women's Institute of Glenmorris, Ont., last year organized a contest among children in trapping ground-hogs. A little girl of twelve years who won first prize presented 105 tails.

Mr. J. E. McLarty, Director, Rural Science Department, Prince of Wales College, Charlottetown, has given up his position to engage in farming in the province of Saskatchewan.

The Department of Agriculture of Saskatchewan, in co-operation with the agricultural societies in the province, arranged a series of auction sales of farm horses at different points in the province.

At the request of the United Farm Women of Alberta the board of governors of the University of Alberta have consented to provide a boys' and girls' conference extending over one week at the University in June.

A farmer in Wellington county advised the Agricultural Representative that the keeping of records of the weight, and test of the milk produced by his herd during the past year had been worth at least \$150 to him.

In the province of British Columbia the law provides that any school board wishing to establish manual training or domestic science will be assisted to the extent of half the cost of equipment up to a total grant of \$500.

An official of the Animal Husbandry Division of the United States Department of Agriculture makes the statement that "After a dog has once formed the habit of killing sheep, it seemingly becomes a mania with him, and he is seldom, if ever, broken of it. He not only destroys sheep himself, but leads other dogs to the work."

To provide for the increasing number of teachers who desire to take the summer course for teachers in the province of Ontario, a portion of the class this year will be accommodated at the Ontario Ladies' College at Whitby. The Ontario Agricultural College will provide for 200 and the Ontario Ladies' College for 110.

Prof. W. J. Rutherford, Dean of the Faculty of Agriculture, University of Saskatchewan, Saskatoon, has accepted the chairmanship of the committee to examine the lands now held under grazing leases in Southern Alberta to ascertain what areas will be suitable for mixed farming in connection with the campaign now being carried on by the Soldier Settlement Board.

The Secretary of the Advisory Board of Women's Institutes of British Columbia has issued an appeal to the secretaries of individual women's institutes in the province to assist, wherever possible, the organization and work of boys' and girls' clubs. The secretaries are further recommended, wherever possible, to secure the active co-operation and assistance of the school teacher in their respective districts.

The Ontario Department of Agriculture has appointed Mr. Charles Laidlaw, a graduate of the Ontario Agricultural College, as ranch specialist for the Department. Mr. Laidlaw will have headquarters at the Burwash Industrial Farm and will be required to make personal visits to all ranches in Ontario, which are situated chiefly in Haliburton, the northern end of Hastings County, Parry Sound and Manitoulin Island. Before his appointment Mr. Laidlaw was manager of a ranch near Powassan.

The Junior Farmers' Inter-county Judging Team that won the championship award at the Ontario Winter Fair at Guelph, met the corresponding team from Eastern Ontario at the Union Stock Yards, Toronto, for a final test. The former team was from Durham County and was trained by Mr. G. A. Williams, the Agricultural Representative. The Eastern Ontario team was from Lanark County and was trained by Mr. E. P. Bradt up to the beginning of the year and afterwards by his successor, Mr. Fred Forsythe. The Durham County team won over the Lanark County class with a score of 1,925 against 1,690.

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Dairy Outlook for the Coming Season. H. H. Dean, Professor of Dairy Husbandry, Ontario Agricultural College, page 3.

March 15.—How to Raise the Standard of Canadian Butter, Professor H. H. Dean, page 3.
Cutting Costs in Fruit Growing, J. W. Crow, Professor of Horticulture, Ontario Agricultural College, page 5.

The Canadian Horticulturist and Beekeeper, Peterboro, Ont., February,

Spray Recommendations to Ontario Fruit Growers for 1919. L. Caesar, Provincial Entomologist, Guelph, page 21.

Time for an Improvement, G. H. Vroom, Chief Fruit Inspector, Middleton, N.S., page 22.

The Geranium—A People's Flower. F. E. Buck, B.S.A., C.E.F., Ottawa, page 24.

Raspberry, "Leaf Curl" or "Yellows". G. H. Duff, Dominion Pathological Laboratory, St. Catharines, Ont., page 30.

Canadian Poultry Journal, Hamilton, Ont., February.

Preparing Poultry Produce for Market. F. E. Elford, Dominion Poultry Husbandman, Ottawa, page 43.

The Canadian Poultry Review, Toronto, Ont., February.

More on Light in the Poultry House. F. C. Elford, page 65.

The Canadian Thresherman and Farmer, Winnipeg, Man., February.

Draw Bar Horsepower—What it Means. J. McGregor Smith, Saskatchewan University, page 12.

Farmer's Advocate and Home Magazine, London, Ont., Feb. 20.

Agriculture in Normal Schools. J. B. Dandeno, Inspector of Agricultural Classes, Toronto, page 307.

The Poultry Breeding Pen. F. M. Marcellus, Poultry Department, Guelph, page 310c.

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The Dry Formaldehyde Treatment for the Prevention of Oat Smut. Professor J. E. Howitt, Ontario Agricultural College, page 463.

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Developing Our Boys and Girls—Our Greatest National Resource. J. G. Rayner, University of Saskatchewan, page 283.

Farmers' Magazine, Toronto, Ont., Feb. 15.

When the Stockbreeder Succeeds. Wade Toole, Professor of Animal Husbandry, Ontario Agricultural College, page 11.

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What is the Ideal Gas Tractor? Professor I. J. Smith, Manitoba Agricultural College, page 26.

The Farm and Ranch Review and the Country Home, Calgary, Alta., Feb. 20.

The Nature and Function of Seeds. J. Bracken, Professor of Field Husbandry, University of Saskatchewan, page 150.

Clover Seed Production in Alberta. Don H. Bark, Chief of Irrigation Investigation Division, Canadian Pacific Railway, page 152.

Rotations for Western Farm. W. G. McKillican, Superintendent, Brandon Experimental Farm, page 174.

The Grain Growers' Guide, Winnipeg, Man., Mar. 5.

Substitutes for Corn Ensilage. J. H. Ellis, Experimentalist, Manitoba Agricultural College, page 25.

The Maritime Farmer and Co-operative Dairyman, Sussex, N.B., Mar. 4.

What Clover is the Most Profitable to Grow. Prof. W. Saxby Blair, Superintendent, Kentville Experiment Station, page 612.

The Nor'-West Farmer, Winnipeg, Man., Feb. 20.

Producing Hatching Eggs. Professor M. Jull, Macdonald College, page 239.

Poultry, Pigeon and Petstock Journal of the West, Victoria, B.C., February.

Culling as a Part of Successful Poultry Farm Management. H. E. Upton, Provincial Poultry Instructor, page 3.

"While in the city the improvements have been in the direction of fine, highly equipped buildings, libraries, and apparatus for instruction in science and in some cases in the mechanical arts and home economics, the efforts of the rural districts have been directed towards increasing the number of school houses at the expense of the size of the district and the quality of the school buildings and equipment, until the contrast between the city and rural education has been painful. The time for an inward struggle to throw aside the old, though it be one of our dearest institutions, has come, and one community after another will now respond to the spirit of the times."

"All who have a clear knowledge of the facts regarding rural school consolidation realize that a larger percentage of our rural schools are to be consolidated into larger units, at once providing better conditions for instruction in the general studies and making it possible to add much that relates to the vocations of farming and home-making. In the United States there have been over six hundred successful experiments at complete consolidation of rural schools, and practically no failures."

W. M. Hays, Assistant United States Secretary of Agriculture.

PART V

The International Institute of Agriculture

FOREIGN AGRICULTURAL INTELLIGENCE

All communications in regard to this section should be addressed to T. K. Doherty, International Institute Commissioner, Department of Agriculture, West Block, Ottawa.

SCIENCE AND PRACTICE OF AGRICULTURE

MECHANICAL PLOUGHING¹

METHODS OF PLOUGHING WITHOUT RIDGES

By A. TARCHETTI

*Director of the Mechanical Department of
the "R. Stazione Sperimentale di
Riscoltura" at Vercelli, Italy.*

The most important factors controlling the yield from a machine plough are the way the land is set out and the choice of the most suitable method of ploughing.

PLOUGHING WITHOUT RIDGES.

In this method the furrow-slices are turned always to one side and no open furrows are left, thus facilitating work with harrows, drills, binders, etc., but requiring good well-drained soil. It can be performed in two ways:—

(1) The *ordinary method* (the most used in Europe) consists in successively turning parallel furrows, by moving backwards and forwards between the headlands. It is also

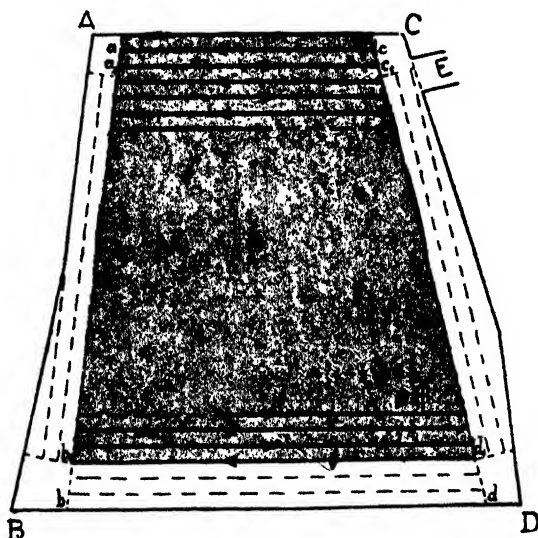


Fig. 1.—Furrows between two parallel sides of an irregular field.

As is well known there are two systems of ploughing—ploughing with or without ridges (2).

(¹) For first part of this article see AGRICULTURAL GAZETTE, March 1919, page 294.

(²) Hilling-up (used for maize and other hoed crops) can be considered as a derivation of both the above-mentioned systems, rather than as a special method, as it first requires the land to be worked uniformly, the hills being thrown up afterwards, usually with double-breasted ploughs.

practised on hilly land, as the furrows can all be thrown down-hill. It requires ploughs that can alternately turn the soil to the right (going) and left (returning) as with one-way, balance, and double Brabant ploughs.

(2) The *Felleberg method* requires uninterrupted furrows, obtained by keeping the plough turning continually in the field, either from the headlands towards the centre or vice versa. With this method there are thus

curved furrows at the corners of the field, therefore leaving small triangular areas unploughed. It evidently necessitates the use of the common single-breasted plough (turning either to the right or left) as in the ordinary motor-or traction-ploughs.

The same type of plough can be used for making ridges, either by gathering-up or

between two regular and parallel sides, as in Fig. I, so as not to leave wedge-shaped pieces that would have to be finished with a team or by hand.

b) In this case it is best not to carry the furrows up to the irregular lines $AB-CD$ of the other ends of the field, but rather to stop them on the rectilinear line $ab-cd$, so that the

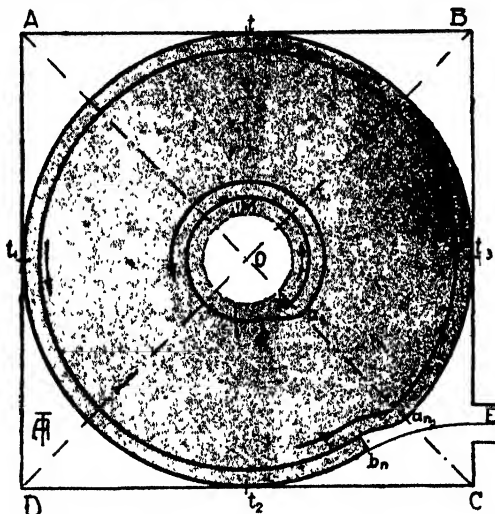


Fig. 2.—Fellemberg method: application to a square field.

casting. This method is too well known to necessitate a description, but, on account of its importance, it will be considered later.

1) ORDINARY PLOUGHING WITHOUT RIDGES.—This can be done on land of any shape or size and requires no special setting-

work will be easier to finish, either with a team or with the machine itself.

c) The entrance into the field should never (as in any system of ploughing whatever) be forgotten, and the order of the work should be subordinated to it so that, when

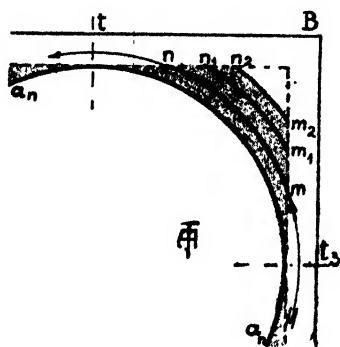


Fig. 3.—Fellemberg method: finishing the corner of a square field in decreasing arcs.

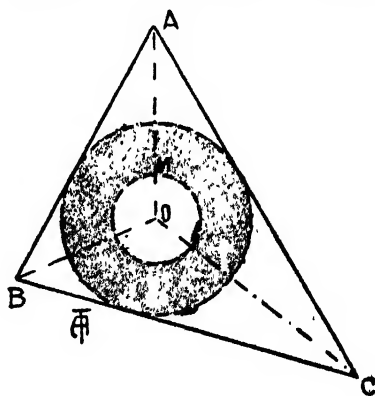


Fig. 4.—Fellemberg method: application to a triangular field.

out of the land, but the following precautions should be observed:—

a) The furrows should be turned parallel to the longest side of the field, to reduce the number of turns at the headland. However, it may be better to sacrifice the long furrow for the advantage of having the furrows

the work is finished, the machine does not need to pass over the ploughed ground. Thus in the case of Fig. I, where E is the entrance to the field, the ploughing will be commenced at ac a, . . . up to b , d , that is, at such a distance from BD as will allow the machine, or the team to pass to

finish the headland b, d, BD . Afterwards, the headland $ab-AB$ is first ploughed, then the strip b, d, bd and finally the headland $cd-CD$, the machine leaving the field at the entrance E .

By ploughing without ridges, the whole of the field can be ploughed, save the small areas at the ends of the headlands necessary for the machine to turn in, proportional to the width of the headlands (I) and which are worked by hand.

When balance ploughs are used the width of the headland is approximately equal to the distance between the two extreme, opposite

is usually heavy and deep the earth being turned over as evenly as possible.

On the other hand this system is much used in America where the large regular spaces, the friable, light soils, and the shallow ploughing, give a certain liberty as regards beginning ploughing, and where rapid work together with the maximum yield from the machine are required rather than regular and perfect ploughing.

With this system the time lost in turning when not working is certainly at a minimum (theoretically it should be nil), as the fatigue caused by turning when working is also

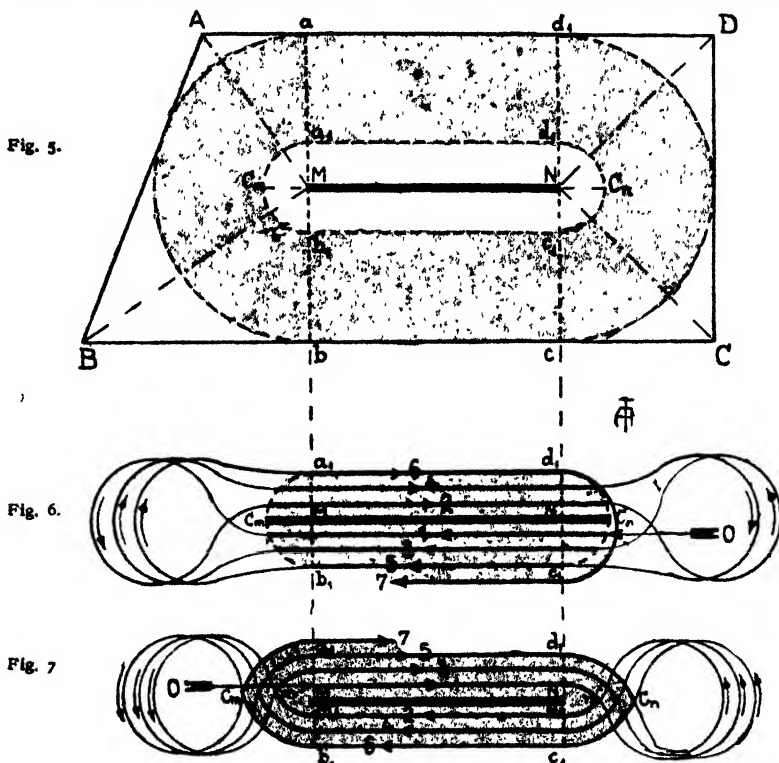


Fig. 5.—Application to a trapezoidal field.

Fig. 6.—Preparation of internal area without ploughing in curves.

Fig. 7.—Preparation of internal area by ploughing in curves.

ploughs. In the case of turnwrest ploughs and double-Brabants, it depends on the breadth of the always-necessary *double, or figure-of-8, turns* that the machine can take, providing that it is not a question of machines with a central gripping-drum, which, up to a certain point, can turn on themselves.

2) FELLEMBERG PLOUGHING. As is well known, it is difficult to turn perfect furrows on a curve so that this system is not advisable in all our soils (in Italy) where the ploughing

minimized, but, on the contrary, very large triangular plots (the size of which increases with the size of the field and the acuteness of the angle) are left in the corners of the field, thus necessitating their being worked with a team or by hand, or even, if so desired, with the machine, but with a great loss of time.

In order that ploughing may proceed normally and uninterruptedly, the field should first be carefully and visibly marked out (by poles, plaster, furrows, etc.) to show the points and geometrical lines symmetrical to the sides of the area and indicating any changes in direction of the furrows.

(1) The headlands are best not ploughed with cable hauled machines, but rather with a team. But if this is required a free strip should be left along AC , so that the machine can leave the field with the anchors or anchor-wagon, etc.

As an example of this procedure let us take a four-sided equilateral field (square or lozenge-shaped), as in Fig. 2. After finding the centre O of the field (where the diagonals AC , BD intersect) a circle OM is described equal to the maximum turn possible to the machine. Then, round this circle ploughing is begun, at a , for example, in a circle concentric to O . When the machine has arrived at b , near the starting point a , it is turned outwards by a distance equal to the breadth of the gang, and the second circle concentric to O is started at a , and so on, up to the last circle, a_n , at a tangent to the edge of the field. The spaces in the circle OM and the triangles A , B , C , D , are then worked, either by hand, with a team or the machine itself according to their area. In the last two cases sufficient space should be left by the last circle a_n between the last furrow and the edge of the field to allow the machine, etc., to pass from one corner of the field to another in order to plough the decreasing

and ploughing of the zone enclosed by these lines is begun as shown in Fig. 6. After opening the median furrow $C_m C_n$ on the line of symmetry, with an ordinary double breasted plough, ploughing is begun, and furrow 1 is turned throwing the soil to the right. When the limit marked by the half-circle $a_1 C_m b_1$ is reached the gang is lifted and a figure-of-8 turn made in the direction of the arrow, to open furrow 2 on the return, always throwing the soil to the right and so on, until the machine arrives at d_1 , when the ploughing becomes continuous, turning around the part already ploughed (shaded area of Fig. 5) to complete the work.

Some authors (3) advise a procedure shown in Fig. 7: the first furrow is started at M , and, at N , the machine is turned to the right, ploughing a small curve Nn ; the ploughs are then lifted and a figure-of-8 turn made to return to n , when the machine ploughs along the line $n N_1 M_1 m$; at m the ploughs are again lifted, and another figure-of-8 turn

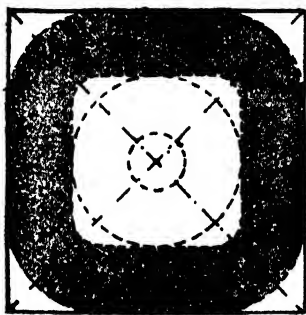


Fig. 8.—Ploughing the internal square by the method of fig. 2.

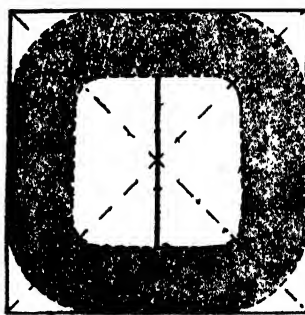


Fig. 9.—Ploughing the internal square by the method of fig. 5.

areas mn , $m_1 n_1$. . . (Fig. 3) at each angle (1).

The procedure is similar in the case when the field is triangular (Fig. 4); the centre O is at the point of intersection of the bisectors of the angles A , B , C , but the plots left unploughed are larger owing to the acuteness of at least 2 angles.

If the field is rectangular or rhomboidal (Fig. 5), the points where the bisectors of the angles A , B , C , intersect are at M , N . The line MN is the line of symmetry of the field, and should be visibly marked in a rectangle formed by the lines ab , cd perpendicular to the parallel sides of the field.

Then, with M and N as centres, the half-circles $b_1 C_m a_1$ and $c_1 C_n d_1$ (2) with the radii MC_m and NC_n respectively and the lines ad and bc are marked on the ground,

made to return to n , and so on, until having reached the minimum turning radius of the machine at c_1 it ploughs round the plot already ploughed, as in Fig. 6, that is, it successively describes the half-circles concentric to M and N (Fig. 5) and the straight furrows between ab and cd . In any case this procedure makes it very difficult to plough on the curved lines Nn , nN_1 , M_1m . . . without considering the fatigue caused by the continual double turns at the end of the furrow (4).

(3) See "Farm Power", published by the INTERNATIONAL HARVESTER CO., of Chicago.—*Journal d'Agriculture pratique*, 1917, No. 6.—*Le Génie rural*, 1917, No. 66.—See also *R.*, 1917, No. 574.

(4) In cases such as Fig. 5, some authors, particularly BERTHAULT (cf. BARRAL and SAUNIER, *Dictionnaire d'Agriculture*, Vol. III, p. 412), have proposed the following method of ploughing, starting, from outside:—at 1 metre from the bisectors and the median line, parallel lines are drawn on each side enclosing headlands 2 metres wide. The first furrow is turned along the edge of the field and then the work gradually proceeds inwards in straight decreasing furrows, while the ploughs are lifted or earthed at each angle turn at the headlands, which are finally split again. This method, however, does not observe the principle of continuous labour proper to the Felleberg system, and, moreover, it necessitates heavy work at the turns and it results in leaving triangular areas between the bisectors that have to be worked by hand.

(1) This method recalls to mind the following very original one, known now for some years, but unsuitable for large areas:—a cable attached to the machine was rolled round a strong post planted firmly in the centre of the field; as the machine advanced, it tended to move in a straight line but, being held by the cable, it was obliged to turn round the post unrolling the cable, and ploughing in the fashion of an Archimedean spiral instead of concentric circles.

(2) To speak exactly, the machine, in describing the curves on starting from the straight line, describes spirals rather than circles.

As is shown in Fig. 5, and as would be expected, the dead angles, i. e., these remaining to be ploughed, are all the narrower as the maximum radius of curvature Ma is smaller. It will, therefore, be seen that it is advisable to consider a field as composed of a number of rectangular or rhomboidal plots and to plough each of them successively. Thus, the square piece in Fig. 2 can be considered as made up of 2 rectangular plots Att_1 , D and BCt_1 , which should be ploughed separately according to the method described above. Again, the field may be considered to be divided into 2 squares, one inside the other, the internal square being ploughed first, either by the method shown in Fig. 2 (Fig. 8) or by that shown in Fig. 5 (Fig. 9), being continued by the Felleberg method round the square.

Fig. 10 shows the case of an irregular, 4-sided field. After finding the bisectors of the 4 angles and their points of intersection M and N , parallels to the sides BC and AD are drawn to meet the bisectors of the respective angles C and D in c and d , thus

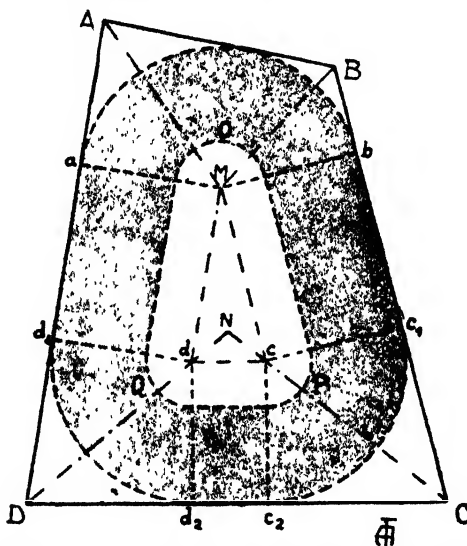


Fig. 10.—Felleberg method: application to a four-sided irregular field.

forming the triangle Mcd . From the apices of this triangle the lines Ma , Mb , cc , dd , dd_1 are drawn perpendicular to the sides of the triangle, then, with M , c , and d as centres, arcs of a circle contained between these perpendiculars are drawn, completing the triangle OPQ . For the interior of this triangle, with N as centre, the procedure is that of Fig. 4, then all outside the triangle up to the edge of the field is ploughed.

If the triangle OPQ is very large in proportion to the total area of the field, it may be advisable to reduce it by constructing a similar but smaller triangle inside it, to serve as a basis for the work. But, in this case, the length of the straight journeys ad , bc , c_1 , d_1 , is decreased, though they justly allow a period of rest for the driver.

In the case of a polygonal or irregular field it is always allowable to split it up geometrically into two or more of the figures considered above, and to plough such parts separately

or, on the contrary, to leave too narrow or too irregular corners to be finished with the ordinary plough.

GENERAL INFORMATION

1194—I. Vitamines and Symbionts.—II. The Action of Symbionts on the Constituents of Fats.—BIERRY, H. and PORTIER, P., in *Comptes rendus des Seances de l'Academie des Sciences*, pp. 963-966. Paris, June 10, 1918; II, pp. 1055-1057. Paris, June 24, 1918.

1.—After referring to the indispensability of vitamines in feeding, the authors give the results of the researches they carried out to ascertain if there is any relation between

vitamines and symbionts (bacteria isolated from the tissues of normal animals).

A first series of researches showed that symbionts introduced into the vertebrate organism were perfectly tolerated, and caused no disorder or suppuration, and seemed to disappear rapidly from the circulatory system, tissues or serous membranes.

As these microorganisms were shown to be harmless, their possible intervention in the phenomena of metabolism remained to be proved.

Young, but nearly full-grown, white rats were used as experimental subjects, then adult rats and finally pigeons. The rations given the subjects were such as would cause disorders of sub-nutrition after a certain length of time (seeds decorticated or sterilised at high temperatures for the pigeons; bacon or bacon fat sterilised at high temperatures coagulated white of egg, salts and water for the rats). Controls received a ration com-

posed of the same foods, but such as would not cause metabolic disorders (seeds with the seed-coats, unsterilised bacon or fat).

RESULTS.—1) The experiments all confirm the chief results obtained by EYKMAN, GRYNs, FUNK, etc.:—loss of appetite, emaciation, locomotor troubles, paralytic phenomena, etc. A prolongation of the experiment led to death preceded by a very intense adynamic state and trophic disturbances in the rats.

When the animal suffering from nutritive deficiency (carenced) was given a normal diet it continued to lose weight for a few days, but, under the influence of the vitamins in the food, the morbid symptoms gradually gave way and it recovered.

2) A carenced animal, already intensely affected with the pathological phenomena already described, is taken and injected under the skin or in the peritoneum with a culture of living symbionts. After 24 to 48 hours, an extremely striking change takes place. The locomotory troubles vanish very rapidly; the animal soon recovers its agility and has a remarkable appetite, especially for fats; the loss of weight ceases, being replaced by a clear gain of weight.

These phenomena are still more striking with pigeons, which pass in a few hours from a complete adynamic state to an almost normal appearance in both walking and flying.

Repeated injections (always 1 cc.) of the living cultures produce the same good results each time.

Thus the introduction into the organism of symbionts of appropriate origin and in suitable form, eliminates the nutritive deficiencies due to a diet lacking vitamins. The initial hypothesis was thus clearly verified by repeated experiments extending over several months.

The only objection that can be raised appears to be that the microorganisms injected act, as far as they are living, by the vitamins they contain and that any harmless bacterium could produce the same good effects.

It certainly seems that certain microorganisms (yeasts) contain vitamins but it should be noted that intestinal bacteria apparently do not contain vitamins since in nutritive-deficiency experiments disorders appear in spite of the abundance and variety of the intestinal flora. It seems remarkable that symbionts, normal inhabitants of the organism, can play the part of vitamins.

II.—The authors wish to show that symbionts can reproduce certain normal phenomena of animal metabolism, especially as regards the constituents of the fats.

Glycerine, which appears to be a source of sugar for the organism, is changed into dioxycetone (triose [C3] sugar which easily changes to hexose). On the other hand it can be probably shown experimentally that salts of X-glycerophosphoric acid can be changed

into salts of dioxycetone phosphoric acid in the same way.

Symbionts can also carry out, *in vitro*, the B-oxidation that applies to fats of low molecular weight. On inoculating a sterile, neutral broth containing 1% of B-oxybutyric acid, proteins and nitrates with these bacteria, the presence of acetone and acetic aldehyde may be detected after three weeks. Starting from butyric acid and using a similar medium to that described, the authors found acetone present in the culture solution; the other substances were not sought for. The presence of acetone shows the production, at a given moment, of the corresponding B-cetonic acid and that of acetic aldehyde shows that the fat molecule has been greatly broken down.

This is the first example, so it appears, of the carrying-out of the physiological process in question by means of microorganisms.

1196—The Comparative Influence of Carbohydrates and Fats on the Utilisation of Food Proteins.—MAIGNON, F., in *Comptes Rendus de l'Académie des Sciences*, Vol. CLXVII, No. 4, pp. 172-175, Paris, 1918.

1197—On the Minimum of Sugar in the Diet and Hitherto Unconsidered Sources of Carbohydrates.—BIERRY, H. and PORTIER, P., in *Comptes rendus de la Société de Biologie*, Vol. LXXXI, No. 11, pp. 574-576, Paris, 1918.

1198—The Food Value of the Banana.—PRESCOT, S. C., in *The Scientific Monthly*, January, 1918, reprinted in *The Journal of the Board of Agriculture of British Guiana*, pp. 52-65. Demerara, April, 1918.

The banana is the principle source of carbohydrates in the diet of many tropical races, taking the place of the cereals and tubers of the diets of temperate zones. Numerous detailed investigations have shown the banana to give a larger unit yield in food material than wheat or any other crop. For this reason it must not be considered as a luxury but as one of the most important human foods, and should receive more consideration from physiologists and agriculturists than has hitherto been the case.

Many analyses have been made of the chemical composition of the edible portion of the fruit. The author gives the averages obtained by Atwater and Bryant (U.S. Department of Agriculture, Bull. No. 28, p. 71, 1906), which forms a sort of general average of the composition of the different varieties (the banana usually eaten in the United States is the fruit of *Musa sapientum*):—water, 75.3 p.c.; protein, 1.3 p.c.; fat, .06 p.c.; carbohydrates, 22 p.c.; ash, 0.8 p.c.; calories per lb., 460.

An analysis of the ash made by the author gave the following results:—Silica, 2.19 p.c.; ferrous oxide, 0.18; lime, 1.82; magnesia, 6.45; sodium, 15.11; potash, 3.55; chlorine, 7.23; sulphur trioxide, 3.26; phosphoric acid, 7.68. The ash is, therefore, composed

chiefly of phosphates, sulphates, and chlorides of potassium, sodium, magnesia and lime, i.e., salts which respond the best to the demands of the body. The banana contains all the substances necessary to maintenance, but its low protein and fat content as compared with the carbohydrate content do not make it possible for the banana *alone* to form a well-balanced ration. To remedy this defect it is sufficient to add milk or a small amount of meat to the ration.

The banana compares favourably with the best animal or vegetable foods; this is shown by a comparative table including widely-different foods. The analytical data given by Atwater and Bryant (*ibid.*, p. 68) for the potato are:—Water, 78.3 p.c.; protein, 2.2 p.c.; fat, 0.1 p.c.; carbohydrates, 18 p.c.; ash, 1 p.c.; calories per lb., 385. These may be compared with the values given above for the banana, from which it is seen that the banana exceeds the potato by about 20 p.c. in food value and calories.

It is commonly believed that the banana is indigestible if not cooked; this is only true if the fruit is insufficiently ripe and completely fallacious for the completely ripe banana, as has been shown by many workers. The following figures, which give the duration of *complete digestion* of various foods show that a ripe banana is digested more rapidly than the most common foods:—

Ripe bananas, 1 hour 45 minutes; vegetable marrow, 1 hr. 45 min.; onions, 2 hr. 5 min.; beans, apples, 2 hr. 30 min.; green peas, 2 hr. 35 min.; oranges, 2 hr. 45 min.; oatmeal, 3 hr. 5 min.; roast mutton, 3 hr. 15 min.; boiled eggs, boiled potato, codfish, 3 hr. 30 min.; plums, 3 hr. 40 min.; nuts, 4 hr.; boiled beef, 4 hr. 15 min.; cabbage, 4 hr. 30 min.; roast pork, 5 hr. 20 min.

The rapid digestion of the banana is caused by the fact that during mastication the carbohydrates are largely transformed to assimilable sugar in the mouth, and further transformation in the stomach requires comparatively little time. The banana is, therefore, not only richer in nutrients per unit of weight than many common foods, but is also more digestible.

For these reasons this fruit should be more largely consumed, especially under present conditions, when it might help to overcome the shortage of cereals and other carbohydrate foods. This is all the more easy as its production is abundant throughout the year, that it may be shipped long distances, may be eaten raw or cooked, as a fruit or a vegetable, and is one of the few foods the price of which has remained normal during the last years.

CROPS AND CULTIVATION

- 1200—Partial Correlation Applied to Dakota Data on Weather and Wheat Yield.—BLAIR, T. A., in *Monthly Weather Review*, pp. 71–73. Washington, February, 1918. (2 pp. in Institute Bulletin.)

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- 1205—Isolation of Cyanuric Acid from Soil, in the United States.—L. WISE, L. E., and WALTERS, E. H., in the *Journal of Agricultural Research*, pp. 85–91, Bibliography of 13 Publications, Washington, July 9, 1917.

- 1207—Experiments on the Influence on the Fertilizing Power of Sewage of the Bacteria it Brings to the Soil.—MASONI, G., in *R. Università di Pisa, Istituto di Chimica Agraria, Studi e Ricerche*, Pt. 22 (1909–1914), pp. 295–327+Bibliography of 22 Publications. Modena, 1917. (2 pp. in Institute Bulletin.)

- 1217—Relation of the Density of Cell Sap to Winter Hardiness in Small Grains; Investigations in the U. S. A.—SALMON, S. C., and FLEMING, F. L., in the *Journal of Agricultural Research*, pp. 497–506. Washington, June 3, 1918. (2 pp. in Institute Bulletin.)

- 1230—Manitoba Wheat in 1918, in Algeria.—TRABUT, L., in *Le Progres agricole et viticole*, pp. 38–39. Montpellier, July 14, 1918.

Manitoba wheat has given good results this year in Algeria. Its resistance to rust was remarkable; not one smutty ear was found in the experimental crops of the Botanical Station, the ears were longer than in the previous year, and the grain very fine. The seed received contained several varieties which it was necessary to separate and cultivate separately. At first sight five different varieties may be easily distinguished:—

(1) *Manitoba A.*—White, more or less long ears with only a few short awns at the tip and three or four abortive spikelets at the base. This form is very similar to Marquis wheat, but behaved differently in summer cultural experiments. Marquis wheat, sown on July 15, 1917, gave a crop in October; it adapts itself well to irrigation, and might be cultivated with maize. Manitoba wheat, under the same conditions, grew, but only gave a few thin ears.

(2) *Manitoba B.*—Is distinguished by longer ears free from abortive spikelets at the base of the ear.

(3) *Fife.*—Similar ear, but red; probably one of the ancestors of Manitoba.

(4) *Huron.*—Long white, bearded ear.

(5) *Beardless, hard wheat.*—Short, close ear. This hard wheat is of good quality, but can only be judged when it has been isolated and grown on a large scale, under varying conditions and compared with the native wheats. At first sight it appears to be a hard wheat suitable for dry countries and late sowing. It is a spring hard wheat. It is not very common in cultivated Manitoba wheat and the ears should be sought for and cut before the harvest.

- 1233—The Production of Flax in Italy.—*Ingegneria Italiana*, p. 103. Rome, August 22, 1918.

Flax production in Italy has been rapidly decreasing during the last twenty years as a

result of the ever-increasing competition with imported cotton. Whereas the production in 1895 was 392,000 cwt. of fibre, in 1913 it was only 39,000 cwt. In that year the Italian flax industry imported 39,000 cwt. of raw flax, mostly from Russia, 3,900 cwt. of carded flax and 78,400 cwt. of flax thread, chiefly from Belgium. The Italian flax industry consists preeminently of weaving. More than three-quarters of the raw material used are imported.

1249—The Pollination of Fruit in Relation to Commercial Fruit Growing (1).—HOOPER, C. H., in *The British Bee Journal*, Vol. XLVI, No. 1463, pp. 13-14; No. 1465, pp. 28-29; No. 1467, p. 45; No. 1470, p. 73; No. 1471, pp. 79-80; No. 1473, pp. 97-98. London, 1918.

The author gives the results of his investigations and experiments on the pollination of fruit trees, including apples, pears, plums, and cherries. Lists of the fertile, and self-sterile varieties of each of these fruits are given, as well as lists of the different varieties which should be planted together. Most of the cross-pollination, specially in the case of apples, is done by insects, particularly hive and humblebees.

The following are the lists referring to apples and plums.

APPLES.—Fertile.—Irish Peach, Golden Spire, Stirling Castle, White Transparent (occasionally), Lord Derby, Tower of Glamis, Duchess of Oldenburgh, Egremont Russet, Devonshire Quarrendon, Summer Golden Pippin, Christmas Pearmain, Domino, Washington, Ben's Red, Red Reinette, Lord Grosvenor, Early Victoria, Ecklinville, Allington, King of the Pippins, Peasgood's Nonsuch, Pott's Seedling, Gladstone, Newton Wonder.

Self-sterile.—Astrachan, Ribston Pippin, Lord Suffield, Hoary Morning, Warner's King, Nonpareil, Striped Beefing, Sturmer Pippin, Fearn's Pippin, Belle de Pontoise, Duchess's Favourite, Bismarck, Cox's Orange, Beauty of Bath, Hambling's Seedling, King of Tompkin's, Beauty of Kent, Cellini, Worcester Pearmain, Seaton House, The Queen, Rival, Alfriston, Lady Sudeley, Loddington, Blenheim Orange, Waltham Abbey, Prince Albert, Grenadier, Hollandbury, Lady Henneker, Cox's Pomona, Golden Noble, Annie Elizabeth, William's Favourite, Mere de Menage, Sandringham, Graham's Royal Jubilee.

Varieties to plant together.—Bismarck with Barnack's Beauty and Lord Derby; Warner's King and Cox's Orange; Cox's Orange Pippin with Worcester Pearmain, Duchess's Favourite, King of the Pippins and James Grieve; Beauty of Bath with Allington Pippin, Lane's Prince Albert and Gladstone (but Gladstone does not crop well with Beauty of Bath); Bramley's Seedling with

almost any variety, especially Cox's Orange Lane's Prince Albert, Newton Wonder, and Grenadier; Lady Sudeley with Gladstone; James Grieve with Cox's Orange, Stirling Castle, King of the Pippins, and Blenheim Orange; Gladstone with Cox's Orange and Worcester Pearmain; Peasgood's Nonsuch with Wellington; Grenadier with Lane's Prince Albert and Early Victoria; Lord Derby, to some extent self-fertile, but improved by cross pollination, crops well with Graham's Royal Jubilee or Beauty of Bath; Lane's Prince Albert with Lord Derby, Stirling Castle, Grenadier, Beauty of Bath, Cox's Pomona, Bramley's Seedling and Allington Pippin; Annie Elizabeth with Warner's King; Newton Wonder with Prince Albert and Lord Derby; Worcester Pearmain with James Grieve; St. Edmund's Pippin with Ribston; Allington with Worcester Pearmain; Cox's Orange with Sturmer Pippin and Lord Grosvenor.

PLUMS.—Self-fertile.—Victoria and Czar fruit nearly as well self-pollinated as cross-pollinated; Denniston's Superb, Monarch (but should not be planted alone), Early Favourite, Reine Claude Violette, Myrobella, Giant Prune, Early Transparent, Reine Claude de Bavay, Prince Englebert, Early Favourite, Gisborne, Oullin's Golden Gage, Golden Transparent, Pershore, Magnum Bonum (red and white), Kentish Bush, Warwickshire Droopers, Damsons.

Nearly self-sterile.—Rivers' Early Prolific, Mallard, Stint.

Self-sterile.—Histon Gage, Early Orleans, Sultan, Kirke's Blue, Coc's Golden Drop, Coc's Violet, Washington, Late Transparent, Ickworth Imperatrice, Early Greengage, Old Greengage, Reine Claude d'Altham, Wyedale, Grand Duke, Jefferson, Pond's Seedling, Curlew, Prune d'Agen, Bryarstone.

Varieties to plant together.—Coc's Golden Drop with Pond's Seedling, Early Rivers, Reine Claude Violette, Rivers' Early Prolific, Prune d'Agen, Monarch, Wyedale, Denniston's Superb, Early Mirabella and Reine Claude d'Altham, does best near several varieties of plums; Early Greengage and Old Greengage do not inter-pollinate but set well with pollen of Victoria and Pond's Seedling; Wyedale with Rivers' Early Greengage and Coc's Golden Drop; July Greengage with Old Greengage and Rivers' Early Prolific; Greengage with Egg plums, Early Orleans, Monarch, Pond's Seedling, Kentish Bush, Victoria, Czar, Rivers' Early Prolific; Rivers' Early Prolific with Egg Plums, Early Orleans, Czar, Monarch, Prince of Wales, Pond's Seedling; Belle de Louvain with Prince of Wales, Duke, Victoria, Czar, Egg and Early Rivers; Pond's Seedling with Pershox plums and Damsons; Washington with Pond's Seedling, Early Transparent with Late Transparent and *vice versa*; Reine Claude d'Altham with Coc's Violet, Coc's Golden Drop and Jefferson; Monarch with Rivers' Early Prolific.

(1) See AGRICULTURAL GAZETTE, Nov., 1918, page 1101, No. 649.

LIVE STOCK AND BREEDING

1253—Stock-poisoning Plants of the Range, in the U.S.A.—MARSH, C. D., in the U.S. Department of Agriculture, *Bulletin No. 575*, pp. 1-24. Washington, July 23, 1918.

Very heavy losses in live stock are caused by poisonous plants. The exact extent of these losses is not known, but, in some States, it is estimated to be as much as 3 to 5 p.c., and in others is still higher. In Colorado such losses amount to a million dollars annually, while the annual loss of sheep in Wyoming is placed at 14.6 p.c. As the animals which die are mostly adult ones, ready or nearly ready for market, the loss is all the more severe. For some years past the U. S. Department of Agriculture has been making experiments with poisonous plants. Such experiments are especially difficult because many of the plants toxic to animals only cause illness when eaten in considerable quantities. The aim of the bulletin under review is to give a short description of the more important plants poisonous to stock, so that they may be easily recognised by non-technical people. The effects produced by the plant are also described as well as the time when losses usually occur together with the means of avoiding them. Special attention is drawn to the fact that most poisonous plants, with the exception of the loco group, are distasteful to stock, who only eat them when there is a lack of other food. Poisoning frequently occurs when sheep are kept too long on the same bedding ground; during the first few days they eat all the available plants along the road they pass going backwards and forwards on each day, with the result that they are almost sure to consume poisonous plants later on. As far as possible sheep should be left to graze under natural conditions, that is to say, they should be able to go freely and slowly, separated from each other and not allowed to graze over and over upon the same ground.

The plants discussed in the bulletin include:—

THE LOCO PLANTS, the most destructive of all poisonous plants. The group includes white loco, or rattle weed (*Oxytropis Lambertii*); purple loco, woolly loco, or Texas loco (*Astragalus mollissimus*); *Astragalus diphysus*. LARKSPURS *Delphinium cucullatum*, *D. Barbeyi*, *D. Menziesii*, *D. bicolor*, *D. virescens* (—*azureum*). WATER HEMLOCK (*Cicuta*). DEATH CAMAS, *Zygadenus venenosus*, *Z. elegans*, *Z. paniculatus*. LUPINE, also known as blue pea and wild bean. LAUREL, *Menziesia glabella*, black laurel (*Leucothoe Davisiae*), *Ledum glandulosum*, white laurel (*Azalea occidentalis*), *Rhododendron albiflorum*. COMMON BRACKEN FERN (*Pteris aquilina*). WILD CHERRY. MILKWEED (*Asclepias*). WOODY ASTER (*Xylorhiza Parryi*). COLORADO RUBBER PLANT, or pingue (*Hymenoxys floribunda*). WESTERN SNEEZEWEED, or

yellow-weed (*Dugaldia Hoopesii*), *Psoralea tenuifolia*.

1259—Cattle Lice and How to Eradicate Them.—IMES, MARION, in U.S. Department of Agriculture, *Farmers' Bulletin 909*, 27 pp. Washington, February, 1918.

The bulletin under consideration treats of the following lice:—the short nosed cattle louse (*Haematopinus eurysternus*), the long-nosed cattle louse (*Linognathus vituli*) and the common biting louse (*Trichodectes scalaris*). The life history and habits of each are described. When separated from their host the first two species live about 7 days, the third one only about 4 days. Newly hatched lice only live 2 or 3 days if they find no host. The longevity of the lice and the viability of their eggs when separated from their host are of great practical importance in their eradication.

The parasites detached from the animals drop in the corrals, stables and pastures, and though the adults die in about a week, the eggs may hatch if the weather is mild and continue to infect the herds. Infected stables should be cleaned and disinfected with coal-tar creosote suitably diluted. Animals which have been dipped or otherwise treated to free them from lice should not be taken to contaminated quarters or those they occupied previously unless they have first been cleaned and disinfected or left vacant for about 20 days.

Methods of controlling cattle-lice are:—

(1) Hand applications:—(a) dusting powders (naphthalene and pyrethrum), which are useful in holding the parasites in check when the weather is too cold for dipping or spraying; (b) greases:—cotton-seed oil and kerosene in equal parts; $\frac{1}{2}$ pint of kerosene and 1 lb. of lard; crude petroleum; (c) liquids.

(2) Spraying with a hand pump (or an orchard spray) with the liquids recommended for dips; two treatments should be given, 15 or 16 days apart.

(3) Dipping in arsenical solution, coal tar creosote or nicotine.

The first two methods are suitable for small herds, the third (the most efficacious) is suitable for large herds. One arsenical or coal-tar dip is usually sufficient to destroy the long-nosed louse and the common biting louse, but for the short-nosed louse two treatments at intervals of 15 or 16 days are necessary. The cattle should be well examined after the second dip as live lice sometimes remain and a third dip may be necessary about 16 days after the second.

The arsenical dip is made up of 4 lb. 85 per cent pure caustic soda + 8 lb. 99 p. c. pure white arsenic, in fine powder + 8 lb. sal soda crystals + 1 gallon pine tar + sufficient water to make 500 gallons. This dip is usually used cold, but, so as to avoid chills its temperature should be from 65° to 90° F.

Nicotine dips are very efficacious if they contain not less than $\frac{1}{16}$ of 1 p.c. nicotine;

if dips more concentrated than 0.05 are used they are dangerous to the cattle especially if used hot. They are usually given warm, but their temperature should not exceed 110° F. Flowers of sulphur is sometimes added to nicotine dips; it dissolves very slightly and clings to the animal's skin for a long time, thus helping to prevent re-infection.

Two dipping plants are described, one in wood, the other in concrete; both are similar in their general design to that described by the author for sheep (1). The length of the vat varies from 24 to 100 ft. according to the number of animals to be dipped, the width is about 3 ft. and the depth 8 ft. A plant should include pens for keeping the cattle in before and after dipping. The passage ending in a chute which leads to the dip must be well designed. The two plans given show the measurements and detailed construction of the vat, and running and crowding chutes. The plant is completed by a heating system. Attention should also be given to the easy draining of the water.

1266—The Fennec Fox in Captivity to replace the Domestic Cat.—CRÉPIN, P. in the *Bulletin de la Société Nationale d'Acclimation de France*, pp. 225-228. Paris, August 18, 1918.

The fennec fox (*Canis zerda*), so little known at present, is of a certain interest. This pretty little North African fox is easily tamed, and, though it is not common, would be of great service to agriculture could it be reared. It destroys cockchafers, locusts and crickets, all kinds of injurious insects, rats; it is as clean as a cat, requiring no previous training; it takes up little space, does not

smell, eats almost anything, destroys less small birds than the cat, for it cannot climb trees, and is a pleasant companion, with a fine coat. It might well replace the cat, as it has more advantages without the serious defects of the latter.

FARM ENGINEERING

1267—Trials of Machines for Cultivating Vineyards Organised at Montpellier and Roche-de-Brun, France, in 1918.—I. FERROUILLAT in *Feuille d'Informations du Ministère de l'Agriculture*, pp. 6-7. Paris June 18, 1918.—II, CASTEX, *Ibid.*, pp. 3-4. Paris, July 23, 1918. (3 pp. in Institute Bulletin.)

1268—Tractor Operating Data in the U.S.A.—*Official Report of the University of Illinois, Division of Farm Mechanics, in The Implement and Machinery Review*, p. 412, London, August 1, 1918.

Early in 1917 the Division of Farm Mechanics, the University of Illinois, U.S.A., sent to 60 tractor operators in the State of Illinois record sheets, arranged for the purpose of enabling the farmer to keep a yearly record of his tractor operations. When returned, 22 reports were found to have been carefully kept. A summary of the data obtained is given in the appended table. It should be remembered that these data have been obtained from a limited number of successful operators. In only one case (tractors with kerosene-burning motors pulling 3 ploughs) is the number of operations large enough to warrant the drawing of general conclusions.

SUMMARY OF TRACTOR-OPERATING DATA, ILLINOIS, 1917.

Fuel Used	Gas	Gas	Kerosene	Gas	Gas
Operators reporting.....	2	4	14	1	1
Number bottoms on plough used.....	2	3	3	5	6
Original cost of tractor..... \$	827.50	1,041	797.57	20.20	2,610
Years since purchase.....	1.5	2.51	1.96	4.5	2
Different days used.....	32.5	37.25	42.41	58	33
Hours used.....	219	264.25	293.14	363.5	302.5
Hours trouble.....	6	17	16.29	6.25	4.75
Percent time trouble.....	2.74	6.43	5.55	1.72	1.57
Fuel cost..... \$	80.50	109.54	60.28	260.30	360.55
Lubricants cost..... \$	20.45	18.08	19.45	35.53	15.51
Repair cost.....	4.55	43.15	38.16	36.33	2.50
Miscellaneous cost..... \$	4.85	4.57	7.54	20.44	6.95
Operating cost per season.....	110.35	175.34	125.43	352.60	385.51
Depreciation, 20 p.c.....	165.50	208.25	159.51	404.00	522.00
Interest.....	29.79	37.8	28.71	72.72	93.96
Total cost per year.....	305.64	421.07	313.65	829.32	1,001.47
Percent repair cost of original cost.....	0.55	4.14	4.78	1.80	0.096
Acres in farm.....	238	240	258.57	271	675
Acres cropped.....	202	199.75	213.63	200	675
Acres maize.....	131.5	84.5	89.13	60	297
Acres oats.....	70.5	52.5	66.25	110	120
Acres wheat.....		10.0	17.30		
Acres hay.....		42.75	35.93		258
Acres miscellaneous.....		10.00	5.28		
Horses used before tractor was purchased.....	11.5	7.0	9.5	18	24
Horses used after tractor was purchased.....	8	5.0	7.35	18	12
Horses displaced.....	3.5	2.0	2.15		
Gallons gasoline.....	407	527.25	43.8	1,265.5	1,765
Gallons kerosene.....			548.5		
Gallons fuel per hour.....	1.86	1.995	2.02	3.48	5.83
Cost gasoline per gallon, cents.....	19.7	20.77	20.44	20.56	20.42
			9.34		

SIZE OF TRACTORS.—One tractor was of 6-12 h.p., 4 were of 8-16 h.p., 9 of 10-20 h.p., 6 of 12-25 h.p., 1 of 20-40 h.p., and 1 was of 25-40 h.p. Three of the users of 8-16 h.p. machines desired a larger tractor; 3 users of the 10-20 tractors believed that a larger machine would be better adapted to their conditions; only 2 men, one using a 10-20, and the other a 20-40, desired a smaller machine.

TYPES OF DRIVE.—21 machines had wheel drives and 1 had a caterpillar type of drive. Sixteen of the 21 wheel machines had 2 drive wheels. Of the 5 operators whose machines had other than the 2-wheel drive, 3 expressed preference for a 4-wheeled machine with 2 drivers.

HIRED HELP.—The hired help bill was reduced by 10 farmers. The amount of reduction reported varied from one-third to two-thirds of the previous help bill. One farmer operating 320 acres reported that he had been able to dispense entirely with the services of one man.

SOIL PACKING.—Ten operators reported no soil packing; 6 reported packing when the soil was wet; 2 reported packing of maize ground; 3 reported beneficial effects from packing, and one made no report on this question.

PRICE OF TRACTORS.—Practically all the machines were purchased at pre-war prices. To-day the same machines would cost from 60 p.c. to 100 p.c. more, which would materially increase the depreciation charge.

TROUBLE.—The per cent time-trouble is obtained by dividing the hours trouble by the hours used and multiplying by 100. The relatively large per cent time-trouble reported for gasoline tractors pulling 3 ploughs is due almost entirely to one operator who used a tractor having a 2-stroke cycle motor. Omitting the report of this man the per cent time-trouble for this class of machine is 4.15.

DEPRECIATION.—The annual depreciation is estimated at 20 p.c. of the original cost of the tractor.

INTEREST.—The interest (6 p.c. per annum) is thus estimated:—Add the original cost and the annual depreciation; divide this sum by 2; and multiply the quotient by 0.06.

HORSES.—Fifteen of the 22 operators replaced one horse or more by the use of the tractor. These data indicate that on the average a man farms 22 crop acres per horse without the use of a tractor, and 29.7 crop acres per horse when the tractor is used. Nine operators stated that the tractor enabled them to use either lighter horses, more brood mares or young horses.

1145—Public Mechanical Cultivation Trials Organised by the French Ministry of Agriculture and Food Supplies at Noisy-le-Grand, France, in Spring, 1918.—I. RINGELMANN, M., in the *Bulletin de la Société d'Encouragement pour l'Industrie Nationale*, pp. 541-554. Paris, May-June, 1918.—II. *Le Genie Rural*, Nos. 82 and 83, pp. 8-13 and pp. 10-12. Paris, 1918.

I.—The French Ministry of Agriculture and Food Supplies has organized mechanical cultivation trials which took place from April 4 to 10, 1918. There were 55 machines entered by 38 exhibitors but only 36 machines entered by 23 makers or agents actually took part. Amongst these 14 machines entered by 9 exhibitors were of French make, while 22 machines entered by 14 makers or agents were of American make. The 1918 trials were organized with the sole object of putting farmers in touch with the makers or their representatives.

The machines that took part may be classified as follows:—

Cable tractors:—1, Windlass French machine; 2) windlass-tractor, 2 French machines; 3) Haulage-tractor, 1 French machine.

Tractors:—8 French and 20 American machines.

Motor-plough:—1 French machine.

Front-wheel tractor:—2 American machines.

Rotary cultivator:—1 French machine.

As most of the machines have already been described or noted, the author only gives details for those machines that have not been previously examined.

Among the French-made machines the author quotes:—

1) The machines of M. MARCEL, LANDRIN, of Paris:—1 apparatus for changing a motor-car frame into a tractor and 1 apparatus changing a motor lorry into a windlass-tractor.

2) The windlass-tractors of the "Société française des tracteurs-treuls V. Doisy", of Issy-les-Moulineaux, with a 25-30 H.P. engine.

3) The haulage-tractor of M. M. FILTZ, ELMLINGER and CAILLARD, of Juvisy-sur-Orge (Seine-et-Oise), driven by a 30-40 H.P. engine; if required this machine can work as a direct tractor.

4) The tractor of M. B. CHAPRON (Fig. 1), of Puteaux (Seine), driven by a 4 cylinder engine, of 60 mm. bore and 120 mm. stroke, giving 10 H. P. at 1,200 revolutions per minute; cooling by thermosiphon, radiator and fan; 3 speeds of 5,806, 9,843 and 16,404 ft. per hour with direct drive on the lower speed used for ploughing.

The driving shaft connects to each wheel through a claw clutch with 4 notches; there is no differential; to turn, the wheel on the side of the turning centre is thrown out of gear and braked. In this way it turns with a radius of 5 ft. 5 in., while the wheel-base is 6 ft. The driving wheels are 43 in. in diameter while the tyre is 4 in. wide. A hauling windlass could easily be mounted on the driving wheels, when the machine could be used for digging, pulling stumps, moving loads on a steep slope, etc.

The wheels, whose position on the axle can be varied as, for example, in the case of hoeing, are 24 in. in diameter. The front-carriage does not press heavily on

the soil but when the traction passes a certain limit, it must be loaded with an extra 360-370 lb.

The engine is mounted on springs so that it can be used for road transport.

6) The tractor made by M. H. DIMPRES, 35 rue du Banquier, Paris, with a 40 H.P. engine. This tractor has the appearance of a motor lorry (Fig. 2).

7) the "Aurore" tractor built by M. M.

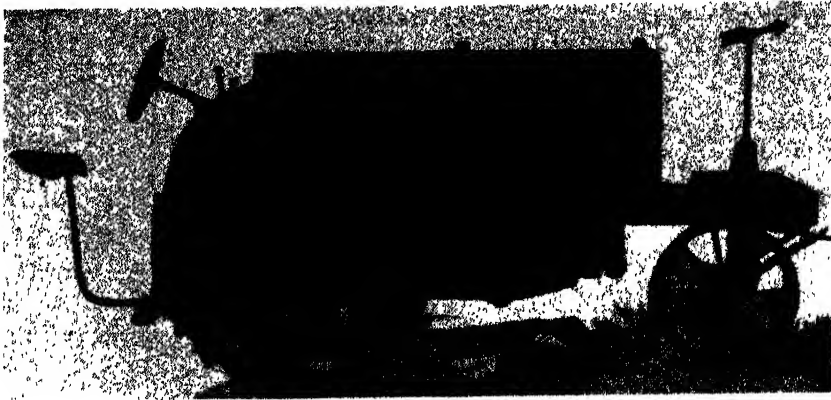


FIG. 1.—CHAPRON Tractor

The total length of the tractor is 8 ft. 10 in. and its greatest width is from 36 to 38 in.; it weighs 2,310 lb. and costs about \$1,900. This tractor is easy to drive, and it may be used for cultivating in vineyards; it has been tested for this purpose at Mont-

FOURNIER, of Levallois-Perret (Seine), whose engine drives the 4 equal-sized wheels. By removing the horizontal chain drive to the front axle, the machine becomes a tractor with 2 driving wheels.

8) The "Motoculteur" of the "SOCIETE



FIG. 2.—DIMPRES Tractor.

pellier, in vineyards near the National School of Agriculture.

5) Two English SAUNDERSON tractors entered by the Paris General Omnibus Company. They are of 10 and 20 H.P. and the Company proposes to make them in France.

LA MOTOCULTURE FRANCAISE" which either works with rotatory implements or as a direct tractor.

9) the motor plough of M.M. TOURAND-LATIL, of Suresnes (Seine). Among the American-made machines the author quotes:-

1) The "Cleveland" tractor (CLEVELAND TRACTOR CO., Cleveland, Ohio) presented by the ALLIED MACHINERY Co. of France, 19 rue de Rocroy, Paris. This chain track tractor (Fig. 3) designed by Mr. R. H. White, is driven by a 20 H.P. engine; its dimensions are:—length 8 ft., width 4 ft. 1 in., height 5 ft. 3 in., it weighs 3,344 lb. Each chain track is 7 in. wide and a length of 4 ft. 1 in. touches the ground; the distance between the axles of the chain wheels is 38 in. The frame, 12 in. above the ground, is mounted on springs. It can move up to 3 miles an hour and its smallest turning radius is under 6 ft. In the latest models the chain wheels and rollers are cased in.

3) The "Hart Parr" tractor (Fig. 4, entered by the BUTTEROSI SYNDICATE, 148 avenue Malakoff, Paris, is driven by a single-cylinder vertical engine of the piston type, of 250 mm. bore, 250 mm. stroke and developing 35 H.P. at 500 revolutions per minute; cooling is by oil circulation. The front wheels, very close together, are 3 ft. 3 in. in diameter; the rear wheels, 6 ft. in diameter and 14 in. wide, are of cast steel with a grooved tyre; the arched grips are bolted on the grooves and project beyond the edge.

The Hart Parr tractor has two speeds, 9,515 and 12,452 ft. per hour, and its total weight is 11,440 lb.



FIG. 3.—CLEVELAND Tractor.

2) The GRAY tractor presented by the AMERICAN TRACTOR CO., 11 avenue du Bel-Air, Paris. This 30 H.P. tractor is sold at approximately £678.

The *Genie Rural* (No. 83) gives the following information about this tractor:—The GRAY tractor belongs to the type of tractor with a single, very broad driving wheel. That of this tractor is 51 in. wide with a diameter of about 59 in. The fore-carriage, mounted on a pivot-bearing, has wheels with a diameter of 37 in. and a width of 9 in. The tractor is 14 ft. long, 6 ft. 3 in. broad and 5 ft. high; it weighs 5,040 lb. The 4 cylinder WAUKESHA motor of 113 mm. bore and 170 mm. stroke runs at 850 revolutions. The BENNETT carburettor and the regulator are enclosed. The magneto and gas controls are fixed on the steering wheel. The driving wheel is connected by two symmetrical chains enclosed in oil baths. There are two speeds forward (2 and 3 miles per hour) and a reverse (2 miles per hour).

According to *Le Genie Rural*, the Hart Parr tractor is composed of 300 different pieces or 500 to 600 pieces less than all the other similar machines in existence. This great simplicity lessens wear and the risk of disastrous breakages during the working season.

(4) The 2 CASE tractors, entered by the CASE COMPANY 251 rue du Faubourg St. Martin, Paris: one 18 h. p. tractor and one of 25 h.p.

(5) The 20 h. p. MOGUL tractors and the 20 h. p. TITAN entered by the COMPAGNIE INTERNATIONALE DES MACHINES AGRICOLES, 155 rue Michel Bizot, Paris.

(6) The 20 h. p. EMERSON tractor entered by the CULTURE MECANIQUE CO., 175 rue de Flandre, Paris.

(7) The 16 h. p. HAPPY-FARMER tractor (1) (sale price £420), (\$2,040) and the 24 h. p. PARRETT tractor (sale price £800,) (\$3,900) both entered by Messrs. GASTON WILLIAMS & WIGMORE, 1 rue Taitbout, Paris.

(8) The GALLOWAY tractor (Fig. 5), entered by the ETABLISSEMENTS DE LACOUR ET FABRE, 4 avenue de Villiers, Paris. This tractor is driven by a 4-cylinder, vertical WAUKESHA engine, of 89 mm. bore and 133 mm. stroke developing 20 h. p. at

tires. The machine is 12 ft. 4 in. long, 77 in. wide and 73 in. high; its total weight is 4,983 lb. of which 1,390 lb. are supported by the front axle and 3,593 on the back axle.

(9) The MOLINE tractor of the MOLINE PLOW Co., 159 bis, quai Valmy, Paris;

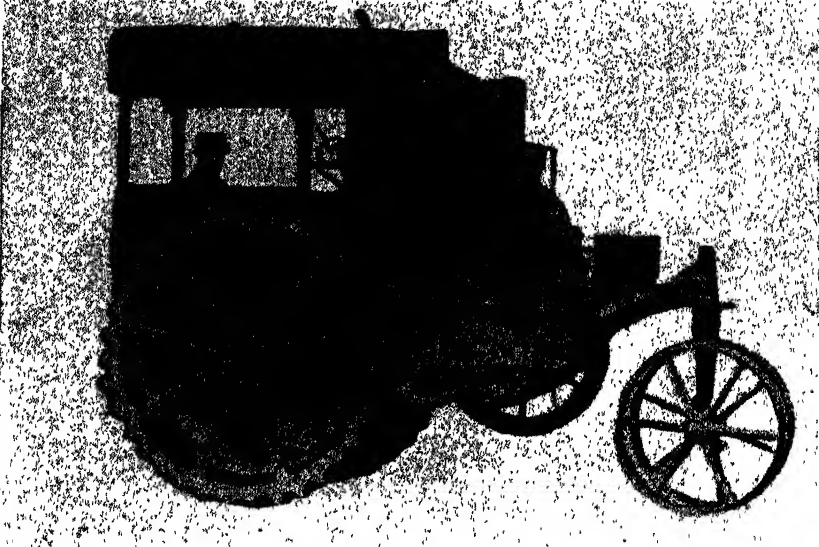


FIG. 4.—HART PARR Tractor.

1,100 revolutions per minute. The carburettor can be used for burning petrol or paraffin. The first model introduced into France is interesting for several details:—the engine is cast solid with the working

2 machines were entered to show the improvements effected.

(10) The NEVERSLIP tractor (Fig. 6), entered by Mr. A. W. PIDWELL, 19 boulevard Malesherbes, Paris. This tractor runs on

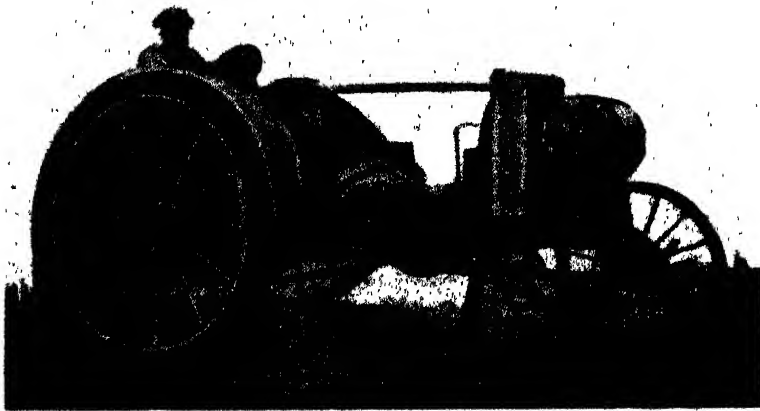


FIG. 5.—GALLOWAY Tractor.

parts and enclosed in a case; the driving wheels are chain-driven and are 58 in. in diameter with tires 14 in. wide. The central-sprung front axle; can deviate greatly compared with the back axle; the front wheels are 36 in. in diameter with 5 in.

the NEVERSLIP chain track. The 4-cylinder vertical engine (102 mm. bore and 152 mm. stroke) develops 25 h.p. at 850 revolutions per minute. The 2 forward speeds give 0.87 and 2.73 miles per hour and the reverse 1.49 miles per hour.

Each chain tread is 12 in. wide and a length of 5 ft. is in contact with the soil. The machine is 9 ft. 6 in. long, 5 ft. 4 in. wide and 6 ft. without the shelter-roof and 9 ft. 5 in. with it.

(11) 2 AVERY tractors entered by M. T. PILTER, 24 rue Alibert, Paris; the 16 h. p. model costs £436 (\$2,120) and the 25 h. p. model £660 (\$3,200).

(12) The 25 h. p. BULL tractor entered by SCHWEITZER & Co., 86 rue de Flandre, Paris.

(13) Two ROCK ISLAND tractors of 16 h. p. (sale price £572) (\$2,780) and 20

678 (Office of Farm Management), pp. 1-24, Washington, D.C., May 7, 1918.

This bulletin gives the results of a study of the agriculture of Jefferson county, Kentucky, a locality which is influenced greatly by a moderately large and growing city, Louisville. In response to a favourable and increasing market for vegetables, an increasing area of land is being utilized for market gardening. The raising of such crops as potatoes and onions has been profitable, principally on account of exceptional marketing facilities. The raising of cereals while still important has declined. The city

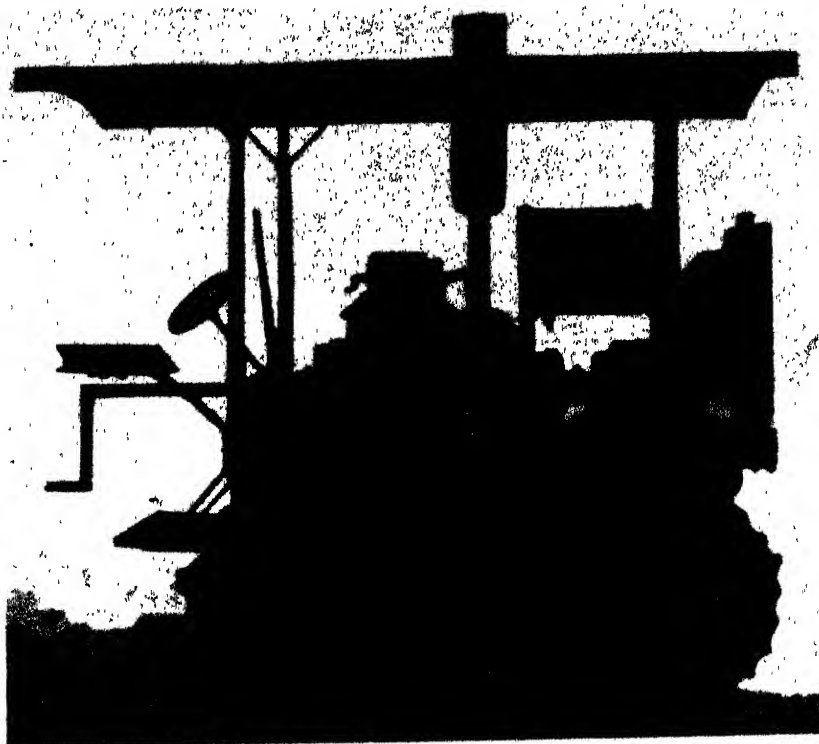


FIG. 6.—NEVERSLIP Tractor.

h. p. (cost, £740) (\$3,600) and one 25 h. p. LITTLE GIANT tractor (cost £900) (\$4,380) entered by the SOCIÉTÉ DES MACHINES AGRICOLES R.I.P., 60 avenue de la République, Paris.

(14) The MACORMICK tractor (20 h. p. Titan tractor) entered by Messrs. R. WALLUT & Co., 168 boulevard de la Villette, Paris.

(II.—*Le Genie Rural* describes some of the most interesting machines entered for the Noisy-le-Grand trials and gives numerous figures.

RURAL ECONOMICS.

1156—Influence of a City on Farming.—ARNOLD, J. K. and MONTGOMERY, F., in *U. S. Dept. of Agric. Bulletin No.*

offers an expanding market for dairy products but by means of railways and tramways the city is quickly and cheaply reached by dairy farms located a long distance out, where cheaper land and other favourable conditions enable the farmer to compete successfully in the dairy market. With the growth of the city, the extension of trolley lines and the improvement of highways, an increasing number of people occupied in the city are living in suburban towns and in the near-by country. All these factors combined created a set of conditions which brought about rapid changes in agricultural practice.

Old types of farms, once dominant, are now disappearing, and new types are organized to profit by the opportunities offered.

Farms that were once profitable as large units, under an extensive system of agriculture come to be relatively unprofitable under new conditions creating higher values for real estate.

These conditions are analysed in this study in order to arrive at an understanding of the underlying principles of farm organization and practice in the area surveyed, to point out the more profitable types of farming and to show how some of the more successful farms are organized.

Sources of information and basis of study.—In the autumn of 1913 about 50 farms were visited and a detailed study was made of the leading crop enterprises. In 1915 another farm-management survey was made of 100 farms in this area, within 20 miles from Louisville, representing various types, in which the organization and the business success of each farm were carefully studied.

The City and the County.—The city of Louisville, on the Ohio River, occupies an area of about 28 square miles, and reached in 1916 a population of 267,342.

The city market place is operated by an association of farmers and business men.

The rural population of Jefferson county, including unincorporated towns was 38,992, showing an increase of 42.4% during the preceding 10 years. During the same period the city population had increased 9.1%. These figures indicate a rapid growth of suburban population. Outside of unincorporated towns the increase was over 30%. Seven per cent of the population in 1909 was foreign-born and 32% of mixed parentage.

There were in 1909 3,093 farms in the county, an increase in ten years of about 9%. During the previous decade the number of farms under 100 acres in size had increased 17%, while farms over 100 acres in size had decreased about 14%. During the same period the area devoted to the raising of vegetables had increased about 29% and the area devoted to cereals decreased about 22%. Within the county during the decade 1899 to 1909 there was a marked decrease in the production of market milk, while three adjoining counties farther out with railway communications had a marked increase in milk sold. The decrease in Jefferson county was 43%, while the increase in three outside counties was about 232%. Jefferson county had a large increase in the amount of butter and cream sold, which to some extent made up for the loss in market-

milk production. Butter, however, is made in small quantities as a by-product on nearly all types of farms, so that the increase in this product cannot be said to make up the loss in market milk production. The census figures further show a decrease in the number of dairy cows in Jefferson county and an increase in the three outside counties during the same period.

Soil and climate.—The soil in the northeastern part of the county is a clay loam similar in character to the bluegrass soils farther east. The southeastern part of of the county has relatively the poorest quality of soil, besides a portion which is hilly or mountainous. Much of the region, however, might be termed river-bottom land.

The climate is typical of that found in the lower elevations of the south-central States. The winters are comparatively wet, the highest average rainfall coming in March. The dry season begins in July and ends in November. The average growing season extends about 186 days, 200 days during the year being available for field work.

The farm practice.—Several types of farming are found in a radius of 20 miles from the city, representing two general systems of farm practice, the extensive and the intensive. The farms practising the extensive system are found toward the eastern part of the county and become more nearly typical as the bluegrass region is approached. These farms usually are large or medium-sized. The rougher and stony parts are kept in permanent bluegrass pasture. Orchard grass and clover are grown in rotation with grain and potatoes. Live-stock enterprises, dealing chiefly with beef cattle, dairy cows, sheep, swine and horses, are important. Irish potatoes, which often take the place of maize as an inter-tilled crop on these general farms, commonly occupy 25 to 50 acres.

On the smaller farms nearer the city the farm practice is entirely different. Nearly all the tillable area of these farms is planted in field truck crops, a very small percentage being left for pasture. Much of the land is double-cropped.

Relation of distance from the City to Type of Farming.—Table I indicates the influence that distance from the city has on the type of farming. Receipts from such field crops as maize, wheat, hay, hogs and stock cattle are grouped in this table under the head "receipts per cent from other sources".

TABLE I.—Relation of distance from City to type of Farm

Distance from City	Number of farms surveyed	Size of farm acres	Rent of land per acre	Receipts per cent		
				From truck and potatoes	From dairy	From other sources
8 miles or less.....	25	102	\$ 11.85	68	10	22
9 to 11 miles ..	18	221	5.99	35	12	53
12 to 14 miles ..	24	256	5.37	34	20	46
15 miles and over ..	33	257	4.66	20	27	53
All farms	100	211	6.80	38	18	44

The small intensive farms near the city are the most profitable.

The relation of size of farm to operating

expenses per acre and to land earnings per acre, with growing distance from the city, is illustrated in Table II.

TABLE II.—Relation of size of Farm to operating expenses per acre and to land earnings per acre.

Size of farm, Acres	Number of farms	Distance from city	Average area of improved land	Operating expenses per acre	Gross receipts per acre	Land earnings per acre	Labour income	Profit on in- vestment
		Miles	Acres	\$	\$	\$	¢	p.c.
Less than 80	21	9	44	73	96	23	1,000	7
80 to 159.....	25	12	121	36	45	9	800	5.6
160 to 299.....	33	13	212	15	20	5	100	4
300 and over....	21	16	420	14	18	4	140	4
All farms.....	100		199	32	42	10		

The main reason for low profits on the larger as compared with the smaller farms is that many of the larger farms are not doing intensive enough agriculture to meet the new conditions brought about by a large and growing city.

Distance from the city a factor in the value of land.—As has been pointed out the

building of good roads, the extension of tram lines, and the nearness of the city have made much of the land in this section desirable for other than agricultural purposes. Such conditions make the average market value of land higher than it should be for agricultural use alone. This is indicated in Table III.

TABLE III.—Influence of the nearness of the City on the value of Land and Rent

Distance from Louisville	Number of farms	Rent of land per acre	Value of land per acre
Less than 8 miles.....	25	\$11.85	\$312
9 to 11 miles.....	18	5.59	110
12 to 14 miles.....	24	5.37	106
Over 14 miles.....	33	4.66	95
All farms.....	100	6.80	158

The effect of land value and nearness to city on the use of manure and commercial fertilizer.—To some extent large quantities of stable manure are used by truck farmers in the vicinity of Louisville. The availability

of manure at a reasonable price is one of the limiting factors in profitable truck farming in the vicinity of the city as shown in Table IV.

TABLE IV.—The effect of land values and nearness to City on the use of manure and commercial fertilizer.

Value of land per acre	Number of records	Distance to Louisville	Size of farm	Rent per acre	Value of farm manure and commercial fertilizer per crop acre	
					Barn manure	Commer- cial fertilizer
		Miles	acres	\$	\$	\$
Less than \$80.....	23	16	284	5.50	3.75	0.60
\$80 to \$150.....	34	13	250	6.60	4.50	0.70
\$151 to \$200.....	22	12	188	8.75	4.60	1.90
Over \$200.....	21	8	95	15.00	18.00	1.25
All farms.....	100	12	212	8.60	7.35	0.90

Comparative study of types of farms.—The foregoing tables show that there is a tendency for the farms to be smaller and

more intensive near the city, while the farms 15 to 20 miles out are larger and raise general crops—maize, wheat, rye,

bluegrass—and keep various kinds of live stock, such as beef cattle, dairy cows, sheep and hogs. These enterprises are the sources of farm receipts, usually pretty well balanced between crops and live stock. Such farms may be classified as the "general mixed type". If dairying becomes a dominant enterprise, with 40% or more of receipts

from milk or milk products, the farm may be classified as a dairy farm. If 40% or more of the receipts come from potatoes alone the farm may be called a potato farm; if from potatoes and truck a potato-truck farm. These classifications are shown in Table V.

TABLE V.—Relation of type of Farm to size of business and labour income.

Type of farm	Number of records	Acres of improved land	Value of capital invested	Total operating expenses per farm	Labour income
General mixed.....	39	270	\$ 34,700	\$ 3,667	\$ 126
Dairy.....	22	205	27,782	3,686	441
Potato.....	11	192	35,000	3,715	333
Potato-truck.....	24	62	20,000	3,950	1,350
All farms.....	96	195	30,084	3,738	520

The potato-truck type of farming is by far the most profitable of the 4 groups. This fact undoubtedly accounts in large part for the tendency towards more intensive farming. It must not be concluded that the potato-truck farms grow only potatoes and truck or that potato farms grow only potatoes. Other enterprises such as maize, wheat, dairy cows, hogs and sheep, have a place of more or less importance on most farms of these types. So also many dairy

farms and general mixed farms handle enterprises characteristic of the more intensive types. Location with reference to the city, the soil and the transportation facilities are the principal factors determining the organization of the more profitable type of farms.

Distribution of capital on farms of different types.—Table VI shows the amount and distribution of capital on the types of farms included in this study.

TABLE VI.—Relation of type of Farm to distribution of capital on 96 farms in Jefferson County, Ky. (Values are averages.)

Type of farm	Number of records	Total capital	Market Value of real estate	Working capital	Investment in live stock	Investment in machinery	Cash to run farm	Investment in work stock	Value of dwelling	Value of other buildings
		\$	\$	\$	\$	\$	\$	\$	\$	\$
General mixed..	39	34,700	30,589	4,111	1,977	722	785	1,050	2,619	1,626
Dairy.....	22	27,782	23,247	4,535	2,911	697	448	661	2,950	2,349
Potato.....	11	35,000	31,406	3,594	1,358	769	1,100	923	3,545	2,002
Potato-truck...	24	20,000	17,511	2,489	847	620	698	697	2,062	946
All farms ..	96	30,084	26,198	3,859	1,986	691	706	844	2,660	1,707

Distribution of crop area.—Table VII indicates that about 50% of the crop area on the average truck and potato truck farms is used in growing truck and potatoes, crops which represent intensive farming.

The remainder of the area is used for growing maize, hay and miscellaneous crops, principally for feeding the work horses, dairy cows and hogs.

TABLE VII.—The distribution of Crop Area on different types of Farm

Type of farm	Number of records	Crop area in farm	Per cent of crop area in							
			Maize	Silage	Pota-toes	Wheat	Hay	Truck	Miscel-laneous crops	Green manure crops
Potatoes.....	11	acres 133	17.9	3.4	24.9	16.2	12.9	3.5	8.8	12.4
Potato-truck..	12	60	15.2	.....	29.6	1.2	12.2	24.1	8.2	9.5
Truck	12	45	16.6	.....	13.1	1.3	12.7	39.9	13.5	2.9
Dairy	22	82	26.0	9.1	5.7	7.3	15.7	2.4	28.8	5.0
General mixed	39	160	27.2	0.9	8.6	17.9	21.4	2.4	14.9	6.7

The distribution of different classes of animals on the different types of farms is as follows:—On the intensive types dairy cows, poultry, and swine are comparatively more important, while on the more extensive types, stock cattle, horses, and sheep are relatively more important. On the more intensive types of farms growing potatoes and truck, there is relatively a large amount of unmarketable products which, without stock to utilize them, would be wasted. Dairy cows, swine and poultry utilize these as well as the permanent pasture, and thus are profitable when in proper proportion to other enterprises.

The important conclusions drawn from this survey are:—

(1) For the area surveyed the small farm intensively cultivated is the most efficient and profitable.

(2) The most profitable types found are those specializing in potatoes and truck.

(3) Dairying combined with truck farming is profitable, but as a type it is gradually being pushed farther away from the city to cheaper land.

(4) The general mixed type of farm, representing the extensive system and a high degree of diversity, is the least profitable in this area.

Descriptions of several farms illustrating types found in this section are appended.

AGRICULTURAL INDUSTRIES.

1281—**Note on Orange-Pip Oil.**—HEWER, D. G., in *The Analyst*, Vol. XLII, No. 497, pp. 271-273. London, August, 1917.

In marmalade factories the pips are separated by centrifugalization. Very few attempts have been made to use them commercially though it would be easy, after

drying, to extract the oil from them either by pressure or the use of solvents. By the use of petroleum ether the author extracted from the pips 37.5% of a golden-yellow, almost odourless oil, at first only slightly bitter, but becoming more so on keeping. The oil saponifies easily and should be suitable for the manufacture of soap.

An analysis of the oil gave the following values: Saponification value 193.7; iodine value, 100.3; specific gravity at 15°C., 0.9208.

1286—**Method of Counting Bacteria in Raw or Pasteurized Milk.**—ALLEN, P., in *The Journal of Infectious Diseases*, p. 245, March, 1918, reviewed in *Office International d'hygiène publique*, pp. 851-853. Paris, July, 1918.

Up to the present the practical bacteriological control of milk has been almost impossible. It could only be done by the general method of isolation on plates, a tedious method requiring at least 24 hours to give a result, and therefore inapplicable in general control as it would be impossible to enforce such a delay before allowing the sale of suspected milk.

The author described in detail a rapid bacteriological method of control which should render great service. An aqueous suspension of alumina mixed with milk holds the bacteria in a tube. By centrifugalizing the mixture an alumina clot is obtained containing all the bacteria free from fat and casein. The residue is spread thinly on a slide and stained. As the alumina particles have little affinity for the $\frac{1}{4}$ -dilution of methylene blue stain used, the bacteria can easily be counted.

AGRICULTURAL ECONOMICS

CO-OPERATIVE DAIRIES IN SWEDEN.

Since 1890 brief statistics as to the production of dairies have appeared every five years in the series called "Publications of the Royal Administration of Agriculture". Since 1913 these statistics have been notably extended and modified. By a Royal order every person in the dairy industry must furnish annual statistics as to his business. This material must be worked up and published by the Central Office of Statistics.

The dairies are of four different kinds. *Co-operative dairies* are associations of milk producers for the utilization of their milk and sometimes also of milk supplied by others and for the sale of dairy produce for the common profit of members. The *dairies of the domains* are those which use milk derived exclusively or mainly from the proprietor's own farms. The *purchasing dairies* treat milk and cream bought from

outside sources. Intermediate between these two latter categories are the *purchasing dairies of the domains* which treat milk derived from the proprietor's byres, but also, and in greater proportion, milk bought elsewhere. In 1916 there were 1,698 of these different kinds of dairies, 111 in the towns and 1,587 in the country.

In the article in the Institute Bulletin details of the work done by the dairies are given.

AGRICULTURAL CO-OPERATION IN SOUTH AFRICA.

A general co-operative movement was initiated in Cape Colony in 1905 when an Act was passed which authorized loans, not exceeding the total sum of £150,000, to be made to farmers and viticulturists for the general purposes of agriculture. The Government appointed an expert to organize

the farmers, and in due course eighteen co-operative societies, namely nine dairy companies and nine companies of wine producers, were established and were registered as limited liability companies. In addition a few syndicates were formed for the purchase, with loans obtained from the Government, of such requisites as fencing material, windmills and threshing machines to be used by the members of the syndicates in common.

The hopes entertained of these various co-operative societies at their foundation have on the whole been disappointed. A few of the societies are doing well and others are maintaining themselves with difficulty, but many have signally failed.

AGRICULTURAL CO-OPERATIVE SOCIETIES IN ARGENTINA.

Rural co-operation which was inaugurated in the Argentine Republic about fifteen years ago has met with many obstacles, among which were the thinly populated character of the rural districts, the great area of most farms, the distances separating these farms from inhabited centres, and insufficiency of means of transport. The very conditions, however, which impeded co-operation at first, render it absolutely necessary to the progress of the rural population, and its future is assured.

The article in the Institute Bulletin gives statistical details of the activity of co-operative societies in Argentina in 1913-14 and 1914-15. Considerable progress was made during the two years, and judging from the local press, the progress would be more evident if later data were available.

Co-operative societies insuring against hail and agricultural machinery fires, have developed rapidly owing to the immediate advantages they procure for their members. The mixed co-operative societies for purchase and sale of agricultural products and machines, those of consumption and those of converting products, etc., are beginning to give proof of the advantages they offer and to gain rural public opinion.

One of the fortunate consequences of rural co-operation in Argentina is that the small cultivators, who used to be the victims of local usury, are able to obtain the credit they need so much.

The article closes with a number of tables, giving figures of the purchases, sales, loans, insurance business, and other transactions of agricultural co-operative societies in 1913-14 and 1914-15. During that period the number of societies increased from 56 to 73, the total effective capital increased from \$4,901,300 to \$5,886,000, the value of operations, of purchase, sale, lending etc., from \$7,858,300 to \$11,536,800, and the value insured against hail from \$26,916,500 to \$40,179,100.

AGRICULTURAL CO-OPERATIVE SOCIETIES IN GERMANY IN 1916-17.

At the end of 1916-17 there were 29,082 agricultural co-operative societies in the German Empire, this number having increased by 330 since the previous year. The new societies include representatives of all the groups except that of co-operative dairies. The number of new savings and loan banks, 84, is however, small, a fact due first to the plentiful supply of ready money which lessened the demand for credit, and secondly to the fact that experienced persons able to establish these societies were not available. The increase in the number of purchase and sale societies, 78, was somewhat more satisfactory. The miscellaneous societies recorded the largest increase, one of 168. On June 1 1917 there were 95 central co-operative societies; 12,912 savings and loan banks; 2,954 purchase societies; 3,594 co-operative dairies; and 4,535 miscellaneous co-operative societies. The membership of these societies is estimated at 2,800,000. Seventy-nine per cent or about four-fifths of German co-operative societies are agricultural.

The co-operative loan and savings banks form the largest group. They received very substantial deposits in 1916-17 but the demand for personal credit was small. Co-operative purchasing societies had a very limited scope for their activities because the free purchase of agricultural requisites was restricted. For the distribution and allocation of rationed goods there seems to have been too little recourse to co-operative societies. Co-operative dairies have suffered much by the war, for they have had to work under government control and to meet heavy expenses while receiving inadequate remuneration. Their former reputation as collecting depots for butter has suffered because they have delivered inferior produce. The vintners' societies have made no material progress in spite of the enhanced prices of wines. Progress has however been recorded by the co-operative societies for the sale of cattle, 50 new societies having been added to their number since their outbreak of war.

THE CREDIT TRANSACTIONS OF THE UNITED STATES FEDERAL FARM BANKS.

A statement published by the Federal Farm Loan Board shows that there was last June a marked reduction in the applications to Farm Banks for loans: those received from the whole country numbered only 1,196 and were for a total sum of \$5,127,011. The loans approved in the same month numbered 2,516 and amounted to \$6,793,527.

From the date on which the Federal Farm Banks first became active in May, 1917, until July 1, 1918, they granted and paid 48,297 loans amounting to \$109,-

517,308. This sum was distributed as follows among the twelve banks:—

Federal Farm Bank of	Amount lent
Spokane.....	\$ 17,000,555
St. Paul.....	16,205,000
Omaha.....	13,264,140
Wichita.....	12,292,700
Houghton....	9,807,741
New Orleans ..	7,646,540
Louisville....	6,704,106
Berkeley.....	6,698,400
St. Louis ...	7,172,172
Columbia...	4,746,513
Baltimore...	4,140,500
Springfield ..	3,851,595
Total....	\$ 109,517,308

RURAL PROPERTY IN ARGENTINA.

Argentina has an area of 738,200,000 acres. The population rose from 2,231,049 in 1872 to 3,158,434 in 1888, to 3,954,911 in 1895, and to 8,288,779 in 1915. The cultivated area still only amounted to 60,200,000 acres in 1915, but it must be noted that the figure for 1895 was 12,100,000, 6,080,000 acres in 1888, and 1,433,000 acres in 1872. We thus see that the agricultural activity of the country has grown at a very rapid rate. And as the Argentine Ministry of Agriculture publishes side by side with the data for the cultivated area those for the development of railways, we can but follow this timely comparison which shows that the opening up of means of communication keeps pace with the development of cultivation. There also the figures speak clearly: in 1872 there were 537 miles of railroad; in 1888 the figures rose to 4,748 miles, to 9,105 in 1895, and to 21,600 miles in 1915. In both cases the progress made is striking, and when one reflects on the vast possibilities which still exist there, one can but foresee that their realization will be sure and rapid.

Viewed from the standpoint of rural property the following facts deserve attention: during the crop year 1915-16 15,975,000 acres were under wheat, 3,946,000 acres under flax, 2,493,000 acres under oats, and 9,137,000 acres under maize. These four crops were grown on 31,551,000 acres or 15.45% of the total area of the country and nearly 50% of the cultivated area.

The article in the Institute Bulletin, which covers 18 pages, takes up the subject under the following heads: Mode of Occupation of the Land and Area of Farms; Sale of Rural Properties; and Mortgage Incumbrances on Rural Property in 1915.

LAND SETTLEMENT IN SOUTH AFRICA.

The article in the Institute Bulletin, which is compiled from the "Official Year Book of the Union of South Africa", first discusses

in detail the title to land in South Africa, then takes up the subject of tenure and occupation of land.

The practice of the provinces of South Africa with regard to acquisition, exchange and other disposal of crown lands, was made uniform by the Land Settlement Act of 1912. The Act provides that five-year leases may be granted on special terms to holders who have the option of buying either during the term of lease or after its expiry, upon paying its fixed purchase price in forty half-yearly instalments. In 1916, 210 leases were granted, and 141 holdings amounting, to 416,631 acres were purchased.

Another section of the Act empowers the Government to acquire a particular piece of land on behalf of an applicant who contributes one-fifth of the purchase price immediately, becomes lessee of the holding, and repays the remaining four-fifths of the price in instalments spread over 18 years. He also pays interest at the rate of 4 per cent. The total price must not exceed \$7,500. Under this section 162 holdings of 197,250 acres were acquired from 1912 to 1916. Yet another section of the Act provides for the purchase by the Government of land for subdivision into farms to be allotted to the public.

The article also discusses certain agrarian legislation which has had force since the establishment of the Union and affects the tenure and occupation of land in particular provinces.

THE RETURN TO THE LAND OF PARTIALLY DISABLED MEN IN FRANCE

The Department of Agricultural Labour at the Ministry of Agriculture has formed a special section with a view to permitting partially disabled ex-soldiers to resettle in the country or to settle there for the first time. In order to provoke this return to the land the department has drawn up a programme which comprises on the one hand an orientation of projects towards agricultural occupation by means of appropriate propaganda, and on the other the establishment of the men in the country.

The propaganda is accomplished by means of posters, pamphlets and cinematographic films. The posters are placed in the hospitals where they can be read by all the wounded men, orderlies, nurses and doctors. They are brief, merely conveying the general idea that partially disabled agricultural workers will find the best employment in the country and that if they wish for proof of this fact they need only read the pamphlet, "Disabled Men in the Fields", which will be sent to them gratis on their application to the Department of Agricultural Labour.

This pamphlet is an illustrated tract published by the National Society for the

Protection of Agricultural Labour with funds derived from an open subscription to cover the costs of publication. It is sent gratis to wounded men who ask for it, and shows them what agricultural situations, for which their tastes and aptitudes fit them, are open to them in spite of their disabilities.

The poster is merely meant to attract the attention of wounded men, awaken their curiosity, and induce them to put questions which the pamphlet of propaganda will answer.

The films will enable them to see with their own eyes that, although they are partially disabled, they can still do field-work. One film, showing men who have lost arms or legs occupied by various works of tillage, gardening and stockfarming, will be exhibited in the hospitals which contain seriously wounded men.

This propaganda work, accomplished by these three means which are mutually complementary to each other, deflects the labour of partially disabled men towards rural occupations and induces them to ask for the information with which the department must be able to supply them.

Some of them wish to enter a school of re-education and ask for information as to one in which they can be received. The Department of Agricultural Labour keeps up to date a list of available places in the various schools of re-education for agricultural trades, whether private or State schools, and directs a wounded man to the school nearest the district in which he establishes himself and having agricultural conditions like those of such district. It also takes the necessary steps to procure the man's admission to this school.

There are other partially disabled men who ask to work for a time on a farm, either instead of entering a school of re-education or in order to complete their training after they leave the school. The Department of Agricultural Labour has appealed to farmers through the medium of the great agricultural societies, and has asked them to receive these men and make them into good agricultural labourers or specialized experts. These apprentices cannot at the beginning of their time do work which is worth their board and lodging, and therefore apprenticeship bursaries, which partly repay the farmers for maintaining them, have been instituted.

It is however the chief aim of the propaganda to induce partially disabled men to settle in the country as cultivators or find places there as experts, as shepherds, cowmen, gardeners, bee or poultry experts, etc. To allow of their settlement, land and working capital are needed. The land can be bought or leased. The Department of Agricultural Labour has been led to request the solicitors in the various districts in France to apprise it as to small farms for sale and farms to let, and the department

is therefore able to supply information to partially disabled men who have no property in view.

When once a property has been chosen it must be bought or leased, and then the live and other stock necessary to farming it must be procured. The Department of Agricultural Labour is ready to inform partially disabled men as to the facilities in the matter of credit on real estate and chattels at their disposal, to advise them, and to take all the steps necessary to satisfying their desires and enabling them to carry out their plans.

The department is not however content merely to point out existing resources. It also endeavours to provoke initiative, either of a legislative or of a private character, and thus to facilitate as far as possible the settlement in the country of the partially disabled men.

We should notice finally the importance of the agricultural machines made to compensate for the various kinds of disability. They may be looked upon as supplements to artificial limbs for they allow disabled men to undertake work of which they would otherwise be incapable. The Department of Agricultural Labour instructs the makers as to what machines they must construct and endeavours to have stocks of them constituted, so that they can be placed rapidly, on good terms as regards price, at the disposal of the partially disabled men.

To direct the work of country bred disabled men towards agricultural occupations, and to facilitate for them by every possible means the realization of a plan which they have been induced to form: such is, in brief, the programme of the Department of Agricultural Labour.

PRIVATE COLONIZATION IN WISCONSIN.

To be successful private colonization must accomplish three purposes: it must afford a reasonable profit to the persons selling the land and financing the enterprise; it must give the settler and his family an opportunity to work on the land, and gain a livelihood while working, to make a farm, and to acquire complete ownership thereof within a reasonable interval of time; and it must enable each colony to advance the interests of society.

Three colonies in Northern Wisconsin, situated respectively at Conrath, in Rusk county and in Sawyer county, seem to satisfy these demands.

Great care was taken in selecting lands for them and the attempt is made to secure only settlers capable of availing themselves of the opportunities offered them. An effort is made, moreover, to group settlers by nationalities, while providing them with a common centre where they meet and undergo the fusing process of Americanization.

Three plans are followed in making concessions of land:—

(1) The land is sold unimproved, but the colonizing company offers its services for the purchase of lumber, building supplies and live stock, which it furnishes to the settler at cost price, giving credit for them up to the amount of the first payment, and adding this to the price of the land. In other words, if a settler has to make a first payment of \$500, the company will invest an equal sum in the equipment of the farm.

(2) Forty acres of land are granted, together with a one-storied house measuring 14 by 20 feet, a cow, a small pig, four chickens, mixed clover and timothy seed weighing one bushel, and assorted flower and vegetable seeds. The total cost varies from \$1,100 to \$1,350, and the settler must make a cash payment of \$250. He can obtain further lots of 40 acres each, paying for each of them from \$750 to \$1,000.

(3) Forty acres of land are granted with a house of one and a half stories covering 14 by 20 feet, a barn measuring 12 by 14 feet, seed as by Plan 2, a garden cultivator, a cross-cut saw, an axe, a brush scythe and a mattock. The total cost varies from \$1,250 to \$1,500 and the settler must make a cash payment of \$400. He can obtain further land as by Plan 2.

The company also sets up model farms in the colonies, and these not only provide demonstrations of farming methods but also give work to the settlers in their early days, enabling them to supplement the yield of a farm with earnings.

The company further sees that the settlers enjoy all the advantages to which they are entitled—good roads, schools, conveniences to take children to school, the telephone and the telegraph, and the service of county agricultural agents.

The plans for the latest settlement in Sawyer county include the building of a new city, regard being paid to aesthetic considerations as well as those of convenience.

The settlers in these colonies are encouraged to borrow money of the company in order to extend their activities, for instance for the purchase of cows. Sometimes the company furnishes a new settler with horsepower before he is in a position to buy and keep horses himself. Finally, the company has organized cheese factories in the colonies.

The development of each farm is carefully followed by the company. On forms known as Settlers' Progress Record Cards the building accomplished, the area brought under cultivation and the area fenced, the number of cows, calves, horses, colts and pigs kept, the number of days' work done, the sum owed for stock and the sum owed to the bank, and the amount of the principal and interest of the purchase price paid, are noted year by year in the case of every farm.

The following are data as to the average position of settlers in the best colonies in

Wisconsin. The average was taken from figures supplied by seventy families.

Age of settler when land was bought.....	40
Number of children in his family.....	3
Number of acres in his farm.....	60.5
Price paid per acre.....	\$23.80
Percentage of price paid in cash.....	22.2
Net worth at time of purchase....	\$ 705.92
Annual increase in net worth.....	556.20
Annual increase in value of land ..	88.05
Amount of mortgage (for 49 cases).....	\$ 1,402.42
Average number of horses.....	1.4
Percentage of acreage cleared....	11.6
Percentage of acreage cultivated without removing stumps....	18.4
Percentage of acreage improved..	30

When a farm is settled to the point which gives it value as a security the company grants a title to the settler, who in return mortgages the farm. This mortgage may be for twenty years at 6 per cent, the interest and principal being payable by amortization. The Federal Land Bank of this district, which is situated at St. Paul, is rendering great service in furnishing the funds needed for land settlement. The clearing of land increases its value so rapidly that sometimes within three or four years the 50 per cent of its value which a settler can borrow on his land and the 20 per cent, which he can borrow on his buildings from the Federal Land Bank are equal to, or even greater than, the amount of the original mortgage on the land. The burden of carrying the loan is thus transferred to the bank, and the settler has thirty-five years in which to pay for his land, interest being at the rate $5\frac{1}{2}$ per cent with an additional 1 per cent for amortization. If the amount borrowed from the bank exceed the debt on the land, the settler has a surplus which he can use to buy stock or to improve the land.

It is probable that a colony of the description of these in Northern Wisconsin should extend over at least 20,000 acres, while it would have still greater chances of success if its area were 50,000 acres.

The newly organized American Association for Agricultural Legislation has recognized the need for studying land settlement and has appointed a committee having such duty. Investigations in Kansas, Arkansas, Washington, Ohio and Wisconsin have already been undertaken and there is every likelihood that they will be carried out in all the States of the Union.

THE GROWTH OF ALLOTMENTS IN ENGLAND AND WALES.

It is estimated that there are now more than 1,400,000 allotments in England and Wales compared with 570,000 before the war, an increase of 830,000. The grand total of allotments in the country in July

1918 covered an area of about 200,000 acres. Estimating that one-half of each allotment was planted with potatoes (a moderate estimate) the allotment holders of England

and Wales grew 26,000,000 bushels of this essential crop practically on the spot where the crop is to be consumed.

CONTENTS OF THE INSTITUTE ECONOMIC BULLETIN

In addition to those already dealt with herein, the following is a list of the more important subjects treated in the August and September numbers of the International Review of Agricultural Economics. Persons interested in any of the articles in this list may obtain the original bulletin on application to the Institute Branch, so long as the supply for distribution is not exhausted.

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AGRICULTURAL STATISTICS

CEREAL CROPS OF THE SOUTHERN HEMISPHERE

Products	Area			Production		
	1918-19	1917-18	Five years' average 1912-13 to 1916-17	1918-19	1917-18	Five years' average 1912-13 to 1916-17
	Acres	Acres	Acres	Bushels	Bushels	Bushels
Wheat—						
Argentina.....	16,968,000	17,876,000	16,264,000	184,270,000	218,625,000	141,803,000
South Africa.....	953,000	925,000	743,000	8,600,000	8,833,000	6,175,000
Australia.....	8,649,000	9,698,000	10,038,000	80,836,000	115,366,000	110,387,000
Totals.....	26,570,000	28,499,000	27,065,000	273,706,000	342,824,000	258,365,000
Oats—						
Argentina.....	2,980,000	3,200,000	2,967,000	41,525,000	71,326,000	33,350,000
Flaxseed—						
Argentina.....	3,400,000	3,234,000	4,029,000	27,755,000	22,145,000	33,587,000

GRAIN RESERVES IN THE UNITED STATES

The crop Reporting Board of the Bureau of Crop Estimates make the following reports of the grain on the farms of the United States on March 1, 1919:—*Wheat*—129,258,000 bushels, compared with 107,745,000 on March 1, 1918, and 100,650,000 bushels on March 1, 1917. *Corn*—884,476,000 bushels compared with 1,253,290,000 bushels on March 1, 1918, and 782,303,000 bushels on

March 1, 1917. *Oats*—588,421,000 bushels compared with 599,208,000 bushels on March 1, 1918, and 394,211,000 bushels on March 1, 1917. *Barley*—81,899,000 bushels compared with 44,419,000 bushels on March 1, 1918, and 33,244,000 bushels on March 1, 1917. Merchantable corn, 2,129,764,000 bushels, against 1,837,728,000 bushels last year.

IMPOSTS AND EXPORTS OF WHEAT AND FLOUR

(Flour expressed in equivalent quantities of wheat)

Countries	Imports		Exports	
	1918 January 1st to December 31st	1917 January 1st to December 31st	1918 January 1st to December 31st	1917 January 1st to December 31st
	Bushels	Bushels	Bushels	Bushels
Denmark.....	303,000	1,649,000	13,000	56,000
Great Britain and Ireland.....	176,163,000	207,550,000	326,000	598,000
Italy.....	78,671,000	77,248,000	323,000	1,021,000
Sweden.....	2,402,000	3,673,000	47,000	.....
Canada.....	333,000	325,000	105,373,000	186,346,000
United States.....	17,785,000	36,454,000	208,878,000	168,972,000
Argentina.....	.....	.....	117,311,000	37,829,000
Japan.....	2,851,000	299,000	3,060,000	4,944,000
Egypt.....	765,000	1,122,000	127,000	257,000
Tunis.....	6,000	487,000	107,000	57,000

BROOMHALL'S FOREIGN CROP CABLE MARCH 26th.

France.—The condition of winter wheat is mostly satisfactory. Spring sowings have been retarded by the unsettled weather. Considerable rains have been experienced, which have delayed seeding operations. Determined efforts are being made by the government to lower cost of living.

Italy.—Crop is growing well, being favoured by good weather. No change is reported in the condition of the young crops, which are fairly good on the whole.

Spain.—Crop prospects remain favourable and the outlook is very optimistic. However, markets have been very firm, owing to the short supplies available.

United Kingdom.—The crop on the whole looks well. Sowings are being delayed by unfavourable weather. A prolonged spell of dry weather is desired, otherwise it is feared there will be a decided decrease in the area sown to spring grain.

Denmark.—From latest reports we gather that autumn sown crops have germinated satisfactorily and the condition is generally good.

North Africa.—Recent reports confirm that seeding of the new crop in Algeria is backward.

Norway.—Advices state that both wheat and rye are fully up to average condition.

Egypt.—The country's crop prospects are favourable on the whole and the condition of grain is about average.

Germany.—The chief scarcity in this country is cereals and fats. Apparently it is absolutely impossible to secure actual cash payments for the food that is needed, therefore credits will probably have to be provided and the cost of the necessities supplied made a first charge on future German payments.

PRODUCTION OF MILK, BUTTER AND CHEESE

In the following tables are given the official estimates of the production of milk, butter and cheese in the latest years for which figures are available. For almost every country, statistical information is scarce and incomplete and it has not always been possible to find the data in official publica-

tions. In a number of cases it has been necessary to give computations by competent authorities founded on data of an official character. The countries are grouped according to continents, and, for each continent, are given in French alphabetical order, following the custom of the Institute.

NUMBERS OF COWS AND YIELD OF MILK

Countries	Number of milch cows		Yield of milk	
	Year of official statistics (O) or private computations (P)	Head	Totals	Per head
			Gallons	Gallons
Germany	P. 1912	11,000,000	5,568,000,000	527
Hungary	P. 1914	2,710,000	793,000,000	293
Denmark	O. 1914	1,310,000	756,000,000	576
France	O. 1912	8,318,000	1,670,000,000	204
Great Britain	O. 1907-08	2,764,000	1,209,000,000	437
Ireland	O. 1917	1,505,000		
Italy	P. 1914	2,600,000	686,800,000	264
Norway	O. 1910		61,200,000a	
Netherlands	O. 1913	1,110,000	211,300,000b	
Russia	P. 1914	20,000,000		
Sweden	P. 1911	1,837,000	661,400,000	358
Switzerland	O. 1911	797,000	523,600,000	655
Argentina	O. 1908	2,164,000	57,700,000c	
Canada	O. 1911	2,595,000	980,700,000	378
Chile	O. 1916	155,000	27,400,000	177
United States	O. 1909	20,625,000	6,220,000,000	302
Japan	O. 1916	45,000	12,230,000	273
South Africa	O. 1911	1,900,000		
Australia	O. 1916	1,736,000	550,000,000	317
New Zealand	O. 1917	760,000		

(a) Quantity dealt with in cheese dairies and condensed milk factories.

(b) Quantity dealt with in co-operative dairies only.

(c) Quantity dealt with in dairies only.

PRODUCTION OF BUTTER AND CHEESE

Countries	Year of official statistics (O) or private computations (P)	Butter	Cheese
		lb.	lb.
Denmark	O. 1914	257,487,000	55,116,000
France	P. 1914	286,601,000	
Great Britain	O. 1907-08	102,162,000	64,044,000
Ireland	O. 1907-08	75,039,000(a)	224,000(a)
Italy	P. 1914	110,231,000	354,944,000
Netherlands	O. 1912	148,146,000	211,004,000
Sweden	O. 1916	62,265,000(b)	28,510,000(b)
Argentina	O. 1914	20,518,000(b)	11,934,000(b)
Canada	O. 1910	201,600,000	201,275,000
Chile	O. 1916	2,079,000	3,897,000
United States	O. 1909	1,619,406,000	320,530,000
Japan	P. 1910	231,000	15,000
South Africa	O. 1916	16,014,000	1,975,000
Australia	O. 1916	182,470,000	25,408,000
New Zealand	O. 1916	63,407,000	109,821,000

(a) Quantity made in factories only.

(b) Quantity made in dairies only.

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May, 1919

DOMINION OF CANADA
DEPARTMENT OF AGRICULTURE

The Agricultural Gazette of Canada

EDITOR: J. B. SPENCER, B.S.A

Issued by direction of
THE HON THOMAS ALEXANDER CRERAR
Minister of Agriculture

OTTAWA
J. DE LABROQUERIE TACHÉ
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
1919

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THE FLAX INDUSTRY

IN dealing with questions relative to the flax growing industry in Canada raised in the House of Commons by the Member for East Middlesex, the Honourable Mr. Crerar, Minister of Agriculture advised the House of the action that the Government has taken in support of the industry. The Honourable Mr. Crerar informed the House that the quality of fibre produced in Canada is fully equal, if not superior, to the best produced in any of the European countries and pointed out that the future of the industry depended to a large extent on the development of labour saving devices for harvesting the crop and for manufacturing it into the finished fibre.

In Russia, Holland and Belgium, the Minister stated, where labour is cheap it is a comparatively easy matter to get the necessary labourers to pull the plants from the ground and attend to the further processes of retting and scutching. In Canada where labour is much more expensive we are at a disadvantage. Officials of the Department have been able to help develop a flax pulling machine which has been tested and improved until it can do the work satisfactorily. This machine can pull from four to six acres of flax a day and thus do the work of twenty to thirty hand pullers. The question of retting is also being given attention by the Department.

As was stated in the March Gazette, an experimental flax mill has been established at the Experimental Farm. In this plant tests have been conducted with a view to determining the best method of water-retting and dew retting. The ordinary method of retting commonly prevailing in Ontario is to take the plant after it has been pulled and spread it out on the ground so that it may get the rains from heaven and the dews of night until it has been sufficiently retted. That process was subject to the vicissitudes of the weather. The energies of the officials of the Department are being directed to the investigation of water-retting under Canadian conditions. These experiments, in this connection, it was explained by the Minister, are progressing satisfactorily but they are not by any means completed. Work of this nature usually has to run for a series of years in order to fairly test various methods to ascertain which is the best.

The next process is the scutching, and until very recently no machine had been discovered to take the place of hand scutching, by which every particle of flax straw that is scutched has to be handled by the hands of the operator. About two months ago the head of the Division of Economic Fibre Production of the Experimental Farms was sent to Ireland to investigate a machine for this purpose. This machine gives promise of usefulness and it has been decided to purchase one. The machine will be located in the experimental flax mill at the Experimental Farm and with it the various classes of fibre grown in Canada will be treated to see to what degree of perfection the machine will do its work.

The question of making use of the straw of flax that is grown in Western Canada for its seed is also receiving the attention of the Department. Each year hundreds of thousands of tons of this straw are burned in

cleaning up the fields. Experiments conducted by private individuals indicate that a twine could be prepared from the fibre of this straw. Last fall the Department began the study of this question. Several carloads of flax straw grown in Western Canada have been treated and this year will be spun into twine. In this way it will be ascertained whether or not the production of twine from such fibre as is produced where flax is grown for seed is possible and profitable.

Up to the present the market for Canadian flax products has been chiefly in the United States. It was expressed by the Minister that if we can provide labour saving machinery that will handle the various processes referred to, Canada can be reasonably assured of occupying a position in this industry that will not be surpassed by any other country in the world. Until we can do that experiments will have to be continued.

SELECTING AND TRAINING SOLDIERS FOR AGRICULTURE

BY C. W. CAVERS, DIRECTOR OF INFORMATION, SOLDIER SETTLEMENT BOARD

THE Soldier Settlement Board is not going out into the highways and byways of the large industrial centres and compelling returned soldiers to come in and settle on the land. Neither is it offering alluring inducements to all and sundry to take advantage of the soldier land settlement scheme.

The object of the board is to find returned soldiers who are experienced agriculturists, or are suited to the pursuit of agriculture and who, by reason of that adaptability and choice may be expected to make a success of farming, thus improving their own status in the community and increasing the production of the soil, which is the foundation of the nation's greatness.

To ensure that there shall be the greatest precaution in the selection of the returned soldiers, agricultural qualification committees are working in every province of the Dominion passing on the fitness of soldier applicants for the benefits of the Settlement Act. These qualification committees are composed of men who are known to be thoroughly qualified through training and experience to investigate the claims of the applicants. They know agricultural conditions in their own particular districts and it is their function to see that the returned soldier is justly and impartially dealt with according to the merits of each individual case.

The qualification committee eliminates all men whom they do not con-

sider to be suited for agricultural work.

But there is another class—men who lack only experience but who give evidence that farm work is congenial to them and that they have other qualifications which would make for successful farming. These men are recommended to take agricultural training. It is felt that if an applicant's physical condition will permit him to engage successfully in farming and he is fitted in general he can be assisted to advantage by a course of training. But he must be really sincere in his desire to make farming his life work; he must be industrious, thrifty and physically capable to perform the labour that would be entailed in getting a comfortable living for himself and his dependents.

The agricultural qualification committee, then, having eliminated the impossible candidate and separated the eligibles into two classes, one requiring agricultural training, the other fully qualified to engage immediately in farm work, has the duty of providing for further training for the eligible but unqualified soldier. A number of the Dominion Government Experimental Farms are being used as training centres. At these training centres the candidates learn, by actual experience, how to perform preliminary farm work such as the harnessing, hitching and driving of horses; the handling and feeding of live stock; the operation of farm machinery; ploughing, milking, and other duties which are the ground work of agricultural labour. After a period of training at these centres the candidates are placed on farms with practical farmers, if possible in the district in which they intend to settle. These farmers are carefully selected. They will be men with large human sympathies who will not regard the soldier candidates simply as hired help, to do the menial chores about the farm; but men who will undertake to complete their training by giving them an insight into all phases of practical farm work. his

is a most essential part of the soldier settlement scheme.

The agricultural qualification committees consist as a rule of three men in the province, although Saskatchewan and Alberta have two committees, the farmer with headquarters at Saskatoon and other at Regina, and the latter with headquarters at Calgary and Edmonton. Following are the chairmen of the provincial committees: Prince Edward Island, Mr. Jeremiah Noonan, Albany, Prince Co.; Nova Scotia, Mr. John M. Trueman, B.S.A., Professor of Agriculture; New Brunswick, Thos. Caldwell, Florenceville; Quebec, Mr. H. Barton, B.S.A., Professor of Animal Husbandry, Macdonald College; Ontario, Dr. G. C. Creelman, President Ontario Agricultural College, Guelph; Manitoba, Mr. C. H. Lee, M.A., Professor of Soil Physics, Manitoba Agricultural College, Winnipeg; Saskatchewan, Dean W. J. Rutherford, Faculty of Agriculture, University of Saskatchewan, Saskatoon; Mr. A. E. Wilson, Indian Head; Alberta, Mr. E. L. Richardson, Calgary; British Columbia, Mr. F. M. Clements, B.S.A., Professor of Horticulture, University of British Columbia, Vancouver.

The Board is operating training stations for returned soldiers at the Ontario Agricultural College, Guelph; the Manitoba Agricultural College, Winnipeg; Macdonald College, Ste. Anne de Bellevue, Quebec; the Dominion Experimental Farm at Agassiz, and the Experimental Station at Fredericton. At these points men who are not sufficiently experienced to go direct to the farm will be trained.

In all of the provinces arrangements have been completed for placing returned men with successful farmers who have expressed a desire to train returned soldiers. Already a great many of these returned soldiers have been placed with this class of farmer.

While the candidates are with experienced farmers they will be visited at times by representatives of the Soldier Settlement Board who will

keep a complete record of their progress for the information of the agricultural qualification committee. When this committee considers that a candidate has secured sufficient experience to operate a farm of his own, the candidate is then assisted in acquiring his land, purchasing live stock, implements, and other equipment.

When the fully qualified soldier gets on his own farm he is visited at frequent intervals by representatives of the board who act in the capacity of agricultural advisers and do everything in their power to smooth his road and to ensure his success. The soldier farmers are encouraged to

subscribe for agricultural papers to keep in close touch with the various departments of agriculture, to take advantage of any short course classes in off seasons at agricultural colleges and, in short, to continue to acquire further knowledge.

With such precautions it is felt that the great majority of returned soldiers who finally become masters of their own domain will have accomplished what the Government set out to do, namely, to provide a good living for those men who sacrificed much for their Dominion and their Empire and to increase the productivity of the soil and the wealth of the nation.

For several years there has been a growing recognition on the part of the government of the necessity of giving instruction both in agriculture and in household science, especially in our secondary schools. Although the government has frequently made grants and concessions in order to meet this need, never before has so much been done to remove difficulties and to place this class of instruction within the reach of all. The conditions under which grants will be made are easy, and the requirements under the regulations are of a minimum character.

The importance of instruction in agriculture in this province especially is a point which need not be laboured, and in these days of high prices the necessity for some training in household science is equally obvious.

Hitherto the great obstacle to the giving of this instruction has been the expense and the difficulty of securing qualified teachers. The new regulations (1) go a long way towards removing these factors.

The Hon. W. M. MARTIN,
Premier and Minister of Education of Saskatchewan.

¹In THE AGRICULTURAL GAZETTE, for April, 1919, page 326

PART I

Dominion Department of Agriculture

THE EXPERIMENTAL FARMS

THE DIVISION OF BOTANY

BROWN ROT OF STONE FRUITS

BY W. A. MCCUBBIN, M.A., ASSISTANT IN CHARGE OF FIELD LABORATORY, ST. CATHARINES, ONT.

IN Canadian orchards the greatest attention has heretofore been directed to the question of apple scab, and not nearly enough emphasis has been placed on the brown rot disease of stone fruits, which causes in its way losses fully as great proportionately as those caused by apple scab. In the work of the St. Catharines Laboratory in 1918 more particular attention was paid to this disease and an attempt was made to get more satisfactory and detailed information concerning several doubtful points in its life history, as well as to try out methods of control, particularly the dusting method, which under existing conditions seems to be the most promising if it is shown to be effective. The results of the various phases of the question that were taken up during the year are here discussed in concise form:--

THE APOTHECIAL STAGE

It has long been known that when rotten fruits fall to the ground and are partially buried the fungus then turns into a tough black tissue, which after a resting period gives rise in early spring to small, brown, trumpet-shaped growths, the apothecia. From these apothecia spores are produced which are capable of starting the disease anew. The nature and function of these apothecia are well enough understood, but there seems to be little information as to whether they occur in numbers sufficient to

be a factor in the early recurrence of the disease. In previous years limited surveys have been carried out which showed that the apothecia were produced in quite plentiful numbers each spring if one knew where and when to look for them ⁽¹⁾.

During 1918 this work was continued and a number of orchards of both plum and peach were examined for the disease in early spring. The method consisted in taking a certain number of trees in each orchard and examining the ground under these carefully for the apothecial clusters, each cluster being counted as one. The number of apothecia in each cluster varied greatly. As many as 111 were counted in one cluster, but in general the number was much less, usually ranging from one up to about fifty.

In this survey 40 plum trees in 4 orchards were examined, giving a total of 164 apothecial clusters, or at the rate of 4.1 per tree. In the same way in peaches 23 orchards were covered, involving 225 trees, and under these were found 1,163 apothecial clusters or 5.1 per tree. In 4 peach orchards no apothecia were found. It is to be noted that the above figures would constitute a minimum rather than a maximum, owing in the first place to the certainty of over-looking some of these apothecia, and in the second place to the count

¹McCubbin, W. A., Central Experimental Farm, Report, 1915, p. 974

being made at one particular date, thus missing clusters developing at earlier or later dates. That this last source of error is a real one is well shown by one example where an examination of 20 trees made on May 8th in one orchard gave a record averaging 8.55 per tree, while a later examination on May 16th of a similar number of trees in the same orchard gave an average of 26.3 to each tree so counted. It is to be further noted that in orchards which were ploughed in the fall very few apothecia appeared next spring, and either late ploughing in the fall or very early spring ploughing would appear to afford a practical means of control for this stage of the fungus.

As the chief danger of the apothecial state is in blossom infection in the spring, it might be interesting to note that while the appearance of the apothecia coincides to some extent with blossoming, the apothecia usually appear somewhat earlier than the blossoms and were in 1918 practically over at the time that the peach orchards came into full bloom on May 17th.

BLOSSOM INJURY

Following the record of the apothecial stage an attempt was made to ascertain the extent to which blossom infection takes place in plums, cherries and peaches. In making this survey it was customary to examine 100 blossoms taken in a group in each tree, and to record the number affected by brown rot found therein. In this way there were examined in 23 cherry orchards, 102 trees, involving 10,200 blossoms. In these the brown rot was established in 1,045 blossoms, or at the rate of 10.2 per cent. In the 8 plum orchards examined 35 trees were covered, involving 3,487 blossoms, in which rot occurred on 225, or 6.4 per cent. Four peach orchards were also included and of the 20 trees on which 2,000 blossoms were examined 53 cases of rot were found or 2.6 per cent.

It is, thus seen that the cherry blossoms in 1918 were much more subject to blossom infection than the plums and peaches, and while the actual number of blossoms killed by the fungus was not large in any case and would not materially affect the crop in view of the large number which are always cast, yet the establishment of the fungus in these blossoms provides a means whereby later infection of the fruit is rendered very much easier. In view of the immense spore production that has been found on the fallen blossoms under the trees it is a matter of great wonder that the rot does not bring about greater ravages than is found to occur.

This survey started May 29th at which date there was abundant moisture and there had been several heavy rains and cloudy days in the week preceeding — ideal weather for the fungus.

The fungus was readily found on the blossoms and was usually either visible as an ashy mould, or the typical blackening was present in fruit or pedicels. The percentages given in the survey include the infection in all blossoms seen, but this is too high from a point of view of loss, since many of those attacked would be cast in any case. On the other hand there is a considerable infection of calyces not visible at the time, some of which might later destroy fruit which is set.

This calyx infection is very common. It is readily seen on countless cast calyces on the moist earth, as well as on the trees. Many cases were noted on both cherries and peaches where the calyx was attacked and yet the fruit was set and apparently growing in a normal fashion. Sweet cherry blossoms about to be cast were picked and put in a moist chamber. Of the 128 of these tested, which were without sign of rot when picked, 19, or 14.8 per cent, developed brown rot pustules after 36 hours.

BROWN ROT ON LEAF CURL TWIGS

Although the brown rot fungus has often been suspected of attacking twigs and bark especially of fruit trees, its occurrence in these parts of the tree is rather unusual, at least spores are not readily produced in these situations. The fungus, however, has been found to attack the swollen shoots which result from leaf curl infection. The first case of this kind seen by the writer was at Cedar Springs in 1914 and it has been met with in isolated cases at various times since. In 1918 this sort of attack was rather plentiful in the Niagara district. In one orchard 115 dead and dying leaf curl twigs were collected at random and out of this number 86 or 76.5 per cent bore the brown rot fungus fruiting vigorously. The fungus was extensively present both on the twigs themselves and on the petioles of the leaves arising from them. Such twigs or petioles were sickly or bleached in color in quite marked contrast to the brown appearance of those which were free from the fungus. It is not certain whether the death of the twigs was due to the brown rot fungus or whether its occurrence here was merely secondary. The latter is probably the case since the majority of the twigs hypertrophied by leaf curl dry up and die before the season is far advanced in any case. Although conditions at blossoming time were moist and warm and favourable to the development of brown rot, since that time the weather was so dry that the disease made very little progress even in sweet cherries, which are usually badly rotted in a favourable season. In view of the rather extensive occurrence of this phase of the disease and the profusion of spores found on these twigs the point is of some importance in connection with the spread of brown rot, since attacks of this nature serve to bridge the gap between blossom infection and the later fruit rot

GROWERS' ESTIMATES OF LOSS

In order to obtain the growers' own views on the question of brown rot

and their estimates of losses due to it, a questionnaire was sent out to fifty growers scattered throughout the peninsula. In this questionnaire the grower was asked to record the loss from brown rot in cherries, plums and peaches for 1918, and also to give an estimate of the general average loss from the disease. Answers were received from only 14; of these 10 gave a fairly close estimate, while the remainder gave a general statement only. Unfortunately the answers were too few to enable us to draw general conclusions. Most answers agreed that the loss from rot in 1918 was small; many gave it as nil at least for a number of varieties. In a few cases the estimate of loss ran rather high, up to 40 or even 50 per cent, but in only one case was the loss in 1918 estimated as greater than the average loss. It was remarkable that this grower had in his orchard the greatest number of brown rot apothecia seen anywhere in the spring of 1918. The general opinion seemed to be that the loss in 1918 was $\frac{1}{2}$ to $\frac{1}{10}$ of the average amount. On the whole the loss in last year's crop in plums and cherries was estimated slightly below our survey figures, though the replies received indicate a very fair appreciation of this loss.

FIELD SURVEY

In order to get some definite information as to the actual field loss from brown rot, as well as to check up the replies of growers to our questionnaire, orchard estimates were made during September on rot in peaches and plums. Cherries were not included in this on account of lack of help at the proper time. Our method was essentially the same as that followed in blossom injury survey, namely, 10 trees in the orchard were taken and 100 fruits in a group were counted, the rotten fruits from each 100 being recorded. In plums 16 orchards were thus dealt with involving 16,000 fruits of which 1,265 were found to be rotted, an average of 7.9 per cent. The lowest per cent

in an orchard was 1 per cent and the highest 22. In a similar way in 28 peach orchards examined, mostly Elbertas and Early Crawfords, there were found in the 28,000 fruits counted 818 rotten fruits or 2.9 per cent. The lowest per cent of rot in any orchard was 0.8 and the highest 7.7.

PACKING HOUSE LOSSES

The packing house losses for peaches and plums, that is, the fruit discarded in the packing house for rot, was generally estimated by several reliable packers at about 2 per cent. In estimating the total loss from the disease, however, much of the packing house losses would be covered by the field estimates.

LOSS IN FRUIT ON THE MARKET

Between September 5th and 15th an assistant visited 46 wholesale and retail establishments in Ottawa, Kingston, Kitchener and Toronto, with the object of determining the amount of rot present in their stock last year, as well as to get their estimates as to the yearly losses from this source.

All the 9 dealers who reported on peaches and the 7 who reported on plums estimated their losses, as "light", "little", or "almost none." As to their usual yearly losses various answers were given; two of them reported an average of 15 per cent; 6 have it as 10 per cent; 5 as from 5 to 10 per cent; 1 as 7 per cent and 11 as 5 per cent. If one averages their answers one get 7.5 per cent.

At the same time an actual determination of the amount of rot present in these wholesale and retail establishments was made. In plums 16 lots were counted involving 5,050 fruits, in which there were found diseased 407 or 8 per cent. In peaches 13 lots were counted including 2,970 out

of which 252 cases of rot occurred' or 8.5 per cent.

In view of this finding which may be taken as a fair estimate of the actual loss occurring in wholesale and retail establishments, the dealers' estimates of "light", "little", or "almost none", take on a new meaning. If in spite of their very low estimates for 1918 the actual loss was around 8 per cent it is probable that their losses in other years, when the disease is far more plentiful, will be much greater than the figures they have given.

DUSTING FOR THE DISEASE

Dusting experiments were carried on in seven orchards in sweet cherries, plums and peaches as follows:—

1. 100 plum trees, mainly Niagaras, all dusted on June 1st and 22nd. Five of the Niagaras were dusted a third time on July 30th.

2. 3 ten year old sweet cherry trees dusted June 1st and 22nd.

3. 20 sweet cherry trees also dusted June 1st and 22nd.

4. 25 sweet cherry trees all dusted once June 1st and one half of them dusted again June 22nd.

5. 25 plum trees all dusted June 1st and again June 22nd.

6. 8 sweet cherry trees all dusted twice, June 1st and 22nd.

7. 50 early peach trees very subject to rot all were dusted twice, June 1st and 22nd, and 5 trees were dusted a third time on August 1st.

The season has been very unfavourable to the development of rot, consequently no data of any value can be obtained from these experiments. While practically no rot occurred in any of the dusted trees, the check orchards as well as orchards of similar type and variety in the neighborhood were found to be also as free from rot as the dusted trees. Owing to this lack of result further details are omitted.

NOTES ON DISEASES IN 1918

BY W. A. MCCUBBIN, M.A., ASSISTANT IN CHARGE OF FIELD LABORATORY, ST. CATHARINES, ONT.

THE winter of 1918 was exceptionally severe, and there was a long period of very low temperature in January and February. A great deal of injury resulted especially among the apple trees of the province. This took the form of bud and twig killing, and as well crotch and trunk injury. A great many mature trees were either entirely killed or very badly injured, and many of the latter will no doubt die in a year or two. The peach trees suffered to some extent, but not as much as might have been expected. The severe cold caused some bud injury so that the crop was not up to the usual amount, but the buds had not been developed as far as usual in the preceding year, and thus many escaped injury.

The spring and early summer were moist, but July and August were exceptionally dry. The fall of 1918, however, was very mild and fruit trees in general were able to enter the winter in apparently good condition.

PETIOLE INFECTION ON PLATANUS AMERICANA

Attention was called on June 28th to the falling of leaves of *Platanus* in considerable numbers. Examination of these leaves showed that in every case the petiole was attacked by a *Gloeosporium* (presumably *G. nervisequum*-*Gnomonia veneta*). The leaves themselves, which were fully expanded, were not attacked in any case. It was apparent that the injury to the petiole brought about an irritation which caused the shoot to cut off the leaf. None of the leaves seen were injured, yellowed or wilted, the petiole attack being apparently confined to the cortical tissues.

TOMATO ROT DUE TO AN ASCOCHYTA

During the latter part of the tomato season a fruit rot was observed

to be rather generally present on both green and ripening fruits. Many fruits which were taken in for ripening developed this rot and were destroyed. The characters of the rot were so different from the ordinary troubles of this kind that another organism was suspected. The rot developed rather slowly without much discolouration at the edges, but with well marked flattening of the affected portion. Towards the centre of the spot the tissue assumed a brownish colour and the skin was broken by the extrusion of the fungus in numerous small pimples. On examination this fungus was found regularly to be an *Ascochyta*. Tissue cultures taken from the very edge of the rot tissue gave the same fungus in culture that was obtained from spores by the poured plate method, and this fungus when inoculated into both green and ripening fruits produced the typical rot. Re-isolations from these artificially produced rot spots gave once more the original fungus in pure culture. Specimens of fungus bearing tissue were submitted to Dr. Mel. T. Cook who stated that the fungus is unlike that found by him in tomato leaves. The rot produced by this *Ascochyta* is slow in progress and was only found on fruits towards the end of the season. It is concluded from the observations made that the fungus always enters by some break in the surface of the fruit, and it is expected that the disease will scarcely ever be of much economic importance.

CURRANT POLYPORUS (PYROPOLYPORUS RIBIS)

This fungus was made the subject of some study in the year 1913 when it was found to be rather widely prevalent in a single red currant plantation in the Niagara district. The removal of this plantation precluded further study and the fungus was not seen again until 1918, when it appeared on a plantation on another

farm a couple of miles distant. It is of interest to note that the cuttings for this second plantation were taken from the current bushes suffering from this disease in 1913, and there can hardly be any doubt that the fungus was thus transferred to its new location.

PELARGONIUM WILT

A St. Catharines florist brought in for examination some very unthrifty *Pelargonium* plants which he had received as cuttings and was multiplying for sale. One of these plants was cut up and examined and was found to be suffering from wilt trouble. While no definite wilting of the foliage had been observed the leaves turned yellow and fell off one by one, and growth was very poor even when the plant was kept under normal conditions of warmth and moisture. Microscopic examination showed the presence of fungus mycelium in the vascular system of the stem and cultures made from the tissue developed in every case pure colonies of *Verticillium*. As the fungus was shown by both microscopic examination and cultures to be present within at least two inches of the terminals of the branches it is readily understood how cuttings would be able to transmit the disease.

CUCUMBER ROT DUE TO RHIZOPUS NIGRICANS

A number of cucumber fruits sent in by a grocer were found to be suffering from watery rot spots which increased in size rapidly and soon destroyed the fruit. Cultures made from the internal tissue at the edges of the spots gave pure colonies of *Rhizopus nigricans* and in a number of fruits where the skin on the spots was broken the same fungus developed its typical asporophores in every case.

GIRDLING OF NURSERY PEACHES

Attention was called to a girdling taken place in a considerable number

of young peach trees in the nursery rows at the Vineland Horticultural Experiment Station. An examination of these indicated that the point of attack was in winter killed buds, and cultures from the cortical tissue produced in every case the brown rot fungus which thus may be given responsibility for the injury.

PLUM FALL

The Vineland Horticulture Experiment Station brought to our attention about September 1st a severe dropping of plums in the variety Thanksgiving Prune. The fruits submitted were wizened and shrunken on one side, although they were not due to ripen for three weeks. In these fruits the flesh was killed irregularly, often in streaks with sound tissue between. There was no reference to the direct action of sunlight as the fruits were shrunken and cast on all parts of the tree. It was concluded that the injury resulted from the intense heat and drought conditions in August when with a poor water supply the high temperature brought about death of parts of the fruits, and subsequently caused their fall. A similar shrinking has often been observed on one side of peaches where it has always been found associated with interference of the water supply of the affected part of the fruits, usually because of pedicel injury.

LIGHTNING INJURY TO TOMATOES

There was reported to this Laboratory in July an injury to tomatoes in the field which was apparently due to lightning, since there were no other factors, such as drought or diseases, to cause it at this time. When the plants were about six to eight inches high many of them in an irregular circle about 20 feet wide died or were badly injured. The injury was in the upper leaves and stems, which were blackened, wilted and which finally died. One of these plants was potted in the laboratory and grew normally

from the lower portion later on; also the field plants recovered afterwards where not too severely injured.

BACTERIAL LEAF SPOT OF PEACH

This disease was first noted on July 20 by a fruit grower in the Niagara district who reported an unusual leaf fall on his peaches. The Elbertas were mostly affected but the drop also occurred on Hale. The leaf spot heretofore noted on peaches has always been associated with sickly trees or injured limbs, but in this case the orchard was exceptionally good and has been well cared for since planting, the owner being one of the most painstaking growers in the district. The orchard was examined on July 22 at which time the leaves were rapidly being cast. Much of the dropping was no doubt due to the abnormal dry hot weather of the preceding two weeks, following a rather cool and cloudy June, but the leaf spot was certainly responsible for a great deal of it. In general all the leaves except two or three terminal ones were more or less spotted and about 20 per cent of the twigs of the current year showed one or more lesions of the same type. An examination of the spots themselves pointed clearly to their bacterial nature. They were small and either water-soaked in the early stages, after which the affected tissue dried and fell out leaving a shot hole, or many of them were reddish in colour at the beginning and turned brown with age. In the older spots the surface was often covered with a glistening layer due to bacterial exudate. The tissue of the spots subjected to microscopic examination show no fungous mycelium, but contain hollow cavities filled with immense numbers of bacteria. In addition the macerated tissue gives a very complete separation of the cells from each other. The features of the disease agreed in every way with the descriptions and illustrations given in Hesler and Whetzel's recent work on the disease and was therefore

referred to *Bacterium pruni*. This determination was also confirmed by the Bureau of Plant Industry at Washington to whom specimens were submitted.

As previously noted the ordinary shot hole disease of peaches is common enough and is not likely to be prevalent on thrifty, well-cared-for trees. It is hoped that this occurrence of the bacterial leaf spot will be a sporadic one, since its power for damage appears to be so great that any general and continued occurrence of the disease in peach-growing districts would be a serious calamity.

SILVER LEAF

Silver leaf of fruit trees has come into prominence at various times and places. It is well known in Europe, and has been recorded in Canada from British Columbia, New Brunswick, Quebec and Ontario (1). Some very marked cases have been found by the writer in Northern Ontario where the apple trees affected were growing at practically their northern limit. No case of this trouble was met with in the warmer parts of Ontario until 1915 when quite a number of cases were observed. Several of these have been kept under observation since that time and the tendency to recovery is so marked in most of them, that one may conclude that the type of silver leaf found here differs from the more fatal disease caused by *Stcreum purpureum* and is possibly of the type known to be due to mite infestation.²

A summary on the observations that have been made on these trees since 1915 may be of interest: --

Orchard Number 1.

In 1915 one plum and one peach tree were definitely and generally affected. In 1916 both these trees still showed the trouble on June 1, and in 1918 the plum tree was still

¹H. T. Gussow, Silver Leaf Disease of Fruit Trees, Phytopathology, vol. No. 6: 172, 1911.

²H. T. Gussow, Rept. of Division of Botany, Central Experimental Farm Rept., 1914: 837.

generally affected all over. The symptoms were light, however, the growth was good, and there was a fair crop. The peach tree showed the silver leaf on a few shoots on one side, but these were short secondary shoots on the main limbs near the trunk; the terminal parts of the limbs were not affected. The first formed leaves on the affected shoots were silvered but the later leaves were perfectly normal.

Orchard Number 2.

One plum tree was noted as diseased in 1915, and was badly silvered again in 1916. In 1918 this same tree still bore signs of the trouble, but the symptoms were so faint, that they would probably have escaped observation if the tree were not known.

Orchard Number 3

In 1915 four plum trees exhibited marked symptoms of silver leaf. In 1916 two of these showed silvering but to a less marked extent, while the

remaining two had not a sign of the trouble. In 1918 none of these trees showed any signs of the trouble but an entirely different tree was silvered on one limb, the only case seen in the orchard.

Orchard Number 4

In this plum orchard consisting of nearly 600 trees, 36 cases of silver leaf were noted on July 21st, 1915. As this was such an outstanding case the orchard was mapped to record the position of all the trees, and they were examined again in 1916 on June 1st. At that time there were noted 20 trees showing silver leaf. Nine of these were trees which were affected the year before, while 11 new cases had developed, and 27 trees had apparently recovered. No observations were made in 1917, but on September 23rd, 1918, the orchard was gone over carefully again. Only one case of silver leaf was found in this visit, and it was on a tree which had been silvered both in 1915 and 1916.

THE DIVISION OF CHEMISTRY

SUPERPHOSPHATE AND THE EARLY RIPENING OF CORN

BY FRANK T. SHUTT, M.A., D.SC., DOMINION CHEMIST

PERHAPS there is no better established fact in agricultural science than that phosphoric acid hastens maturity. Phosphoric acid has other functions in relation to plant growth—as for instance, the “stimulation of the early development of the young seedling” and “the increase of the proportion of grain to straw”—but the role it plays in hastening the ripening of the crop stands out, from the practical standpoint, as probably its most important office.

This fact has given superphosphate—otherwise known as acid phosphate—our best carrier of available phosphoric acid, a special value in bringing on the cereal crops to the harvesting stage in cool, wet and backward

seasons, hastening maturity frequently by a week or ten days. All this has been well established, more particularly with the barley crops, by careful experiments in Europe and the United States.

The writing of this note is to furnish an answer to the enquiry recently received: “Can farmers living in the more northern and colder districts of the Dominion, by the use of superphosphate, so hasten the maturing of the corn crop as to bring it to the glazing stage (the condition in which it furnishes the largest amount of digestible matter) before there is danger of frost?”

Though we have no direct evidence from experimental work with corn

we think we are justified, in view of the well established fact already related, in predicting that the application of superphosphate will materially hasten the ripening of the corn crop and in advising this course in such districts as are referred to by our correspondent.

We would suggest an application of say 350 pounds of superphosphate per acre, broadcasted or drilled in on the prepared land before planting, and in order to note the effect on the crop a strip should be left untreated.

Experiments have been planned and will be carried out this season,

on several of the experimental farms and stations, and these we trust may furnish some evidence of a definite character on the points under discussion. Much, however, will depend on the nature of the season; it can only be on cold soils in a cool and wet autumn that the "hastening" effect will be particularly noticeable. In the present state of our knowledge it would certainly not be advisable to substitute the larger, later ripening southern varieties for those which we have proved successful, in the hope that superphosphate may bring them to the glazing condition before there is danger of frost.

DIVISION OF FORAGE PLANTS

EMERGENCY ROOT SEED PRODUCTION

BY M. O. MALTE, PH.D., DOMINION AGROSTOLOGIST

IN 1918, about seventy-five thousand pound of field root seed, including mangel, Swede turnips, and field carrot seed, were produced by the Dominion Experimental Farms and Stations under the direction of the Division of Forage Plants, Central Experimental Farm, Ottawa.

It may seem strange that such a large amount of field root seed should have to be produced by a system of government farms and stations established for the purpose of carrying on experiments and investigations but, if the developments in the field root seed situation in Canada during the years following the outbreak of the great war are considered, the reasons why will be readily understood. A few words will suffice to explain how and why the Dominion Experimental Farms became engaged in the production of field root seed on what may be called a commercial scale and, this explanation given, a brief account of the emergency root seed production by the Experimental Farms System in 1918 will be rendered.

THE FIELD ROOT SITUATION BEFORE AND DURING THE WAR.

Before the war, only small quantities of field root seed were produced in Canada. Some Swede turnip seed was raised in Nova Scotia and some mangel seed in Ontario, but the total amount of root seed produced in Canada was too insignificant to be reckoned with from a Dominion standpoint. In other words, the amount of field root seed produced in Canada before the war was so small that, considering the needs of the Dominion, it was negligible as far as the supply of the country was concerned. Under the circumstances, it is obvious that the vast bulk of field root seed required yearly by Canadian farmers had to be imported. Small quantities came from the United States but most of the root seed was imported from European countries, the United Kingdom, France, Holland Germany and Russia being the chief exporters.

As long as agricultural conditions in Europe remained normal, the Cana-

dian consumers could rely upon being abundantly supplied with field root seed of a reasonably good quality and, as a matter of fact, Canadian farmers were content to have their supply filled from Europe, particularly because the European seed could be had at low prices. After the outbreak of the war, however, the field root seed situation, as seen from a Canadian angle, underwent some changes which, as will be set forth in the following, forced the

than ever before, on the production of food, but also that to the difficulty of procuring seed from Europe was being added the difficulty of finding ocean tonnage for the freighting of the same across the Atlantic and, if tonnage could be secured, to bring it safely to this continent. As a result of the comparative scarcity, the root seed prices rose, during the war, to a ridiculous height and, at the same time, the quality of the seed available declined rapidly.



THRESHING TURNIP SEED ON LAWN AT KENTVILLE, N.S.

Experimental Farms System to take up root seed production on a large scale as an emergency measure.

The United Kingdom, France, and Holland, restricted, as early as 1915, the export of root seed for the duration of the war. Germany and Russia, which used to supply large quantities of root seed, were of course eliminated as exporters of the seed in question and, as a result, the seed supply coming to Canada during the war was being substantially reduced. Be it also remembered, not only that the European seed-producing countries were gradually forced to concentrate their agricultural activities, more

ROOT SEED PRODUCED BY THE EXPERIMENTAL FARMS, 1918.

In view of the circumstances briefly outlined in the above, and following a convention of root seed importers in Detroit, Mich., in the latter part of June, 1917, the Dominion Experimental Farms were asked, on urgent request from the Seed Commissioner, to take immediate steps to provide for the production of large quantities of field root seed for the purpose of meeting a threatening shortage in the supply.

In response to this request, the Dominion Experimental Farms, through the Division of Forage

Plants, made arrangements, in the first week of July, 1917, to raise large quantities of stecklings of Swede turnips, mangels and field carrots, the same to be used for seed production the year following.

VARIETIES SELECTED FOR STECKLING RAISING.

The seed procured for seeding down to stecklings came from different sources and represented varieties of a

stecklings was secured through the assistance of the Seed Branch of the Dominion Department of Agriculture, most of it being guaranteed by the parties supplying the same to represent high-standard varieties tested in respect to purity. Still another part was secured from Canadian seed houses by the Division of Forage Plants directly on the strength of previously gained experience, through the variety of tests conducted for many years by the



TURNIP SEED IN PROCESS OF HARVESTING AT KENTVILLE, NOVA SCOTIA.

varying degree of "genuineness." Part of it was supplied by the Dominion Experimental Farms' System, viz.:—the Central Experimental Farm, Ottawa, and the Dominion Experimental Station, Kentville, N.S. This seed was used for seeding down to stecklings for the reason that it represented varieties which were what is generally termed "improved", i.e. the seed was produced from roots which had the previous year been selected for the explicit purpose of developing improved varieties. Another part of the seed used for seeding down to

Dominion Experimental Farms, in respect to what varieties might be most suitable for the purpose in view.

This explanation as to the source of supply of the seed used for the emergency as it was presented to the Dominion Experimental Farms by the first of July, 1917, is given for the purpose of emphasizing that the best seed available was secured. It should be understood, though, that, owing to the advanced date when the request for emergency root seed production was made, the choice of seed had by necessity to be limited

to only such varieties as were available immediately.

PLACING THE VARIETIES SELECTED.

While the seed needed for steckling growing was being located and pro-

and stations, to secure the acreage necessary for the growing of the stecklings. Owing to the advanced season and the acreage involved it was, generally speaking, out of the question to grow stecklings in any



MANGEL SEED CROP STANDING, AT EXPERIMENTAL STATION SUMMERLAND, B.C.



MANGEL SEED CROP IN SHOCK, EXPERIMENTAL STATION, SUMMERLAND, B.C.

cured, arrangements were made, by the Director of the Dominion Experimental Farms in co-operation with the superintendents of a number of the Dominion experimental farms

quantities to speak of on any land belonging to experimental farms and stations. The land needed had therefore to be rented from private owners, and so it was.

As the steckling crop had to be handled directly by the various experimental farms and stations, it is obvious that, for the sake of convenience, most of the land was being procured from farms adjoining the experimental farms and stations involved. It is equally obvious that, in order to meet the emergency calling for quick action and demanding that large acreages be planted to stecklings immediately, it was impossible to secure, in all instances, land most suitable for the purpose. However, the necessary acreage was provided, and the seed secured in the meantime was promptly dis-

and British Columbia west of the Selkirks. What varieties were allotted to the different farms and stations, may be seen from the list presented in the following which gives the quantities available for sale in the spring of 1919.

MANY DIFFICULTIES ENCOUNTERED.

From the moment that the seed for steckling growing was placed with the various experimental farms and stations, the practical end of the emergency seed growing was, naturally, to a large extent left in the hand of the superintendents



CARROT SEED CROP, EXPERIMENTAL STATION, SUMMERLAND, B.C.

patched to the farms and stations to which steckling growing had been entrusted.

From experience gained during the previous years in field root seed production, it was decided to place practically all the Swede turnip seed secured for steckling growing in Eastern Canada and especially in the Maritime Provinces, while most of the mangel seed and all of the field carrot seed was divided between the Central Experimental Farm, Ottawa, and the experimental farms and stations of Southern Alberta

of the farms and stations involved. Recommendations and advice of a general character on the handling and management of the crops were supplied by the Division of Forage Plants of the Central Experimental Farm at Ottawa, but the detail carrying out of the steckling growing as well as, later, of the seed growing proper was naturally left with the superintendents. It is not the intention in this article to go into any details about the difficulties confronting the superintendents from the moment the steckling crops were

sown to the time when the seed was safely harvested, although the story of the same would reveal many useful object lessons about seed growing on a large scale which are not experienced when, as has been the practice among seed growing farmers in Canada so far, seed growing is confined to fractions of an acre. Suffice it to say that the difficulties were many, the principal ones arising from shortage of efficient

help at the time of harvesting the steckling and seed crops, from adverse weather conditions, during the time of harvesting the stecklings in some instances and during the time of harvesting the seed in other, and, generally speaking, from the necessity of handling the crops on an emergency basis. However, in spite of everything considerable quantities of seed were grown, as will be seen from the following list:

ROOT SEED GROWN 1918.

MANGELS.

Variety.	Where Grown.	Lb.
Yellow Intermediate	Central Experimental Farm.	9,000
Giant Yellow Intermediate.....	Central Experimental Farm	5,000
" " "	Experimental Station, Lethbridge, Alta.	1,000
Half Sugar White.	Central Experimental Farm.	300
" " "	Experimental Farm, Agassiz, B.C.	1,000
" " "	Experimental Station, Summerland, B.C.	7,000
Danish Sludstrup..	Experimental Farm, Agassiz, B.C.	500
" " "	Experimental Station, Kentville, N.S.	500

SWEDE TURNIPS.

Purple Top Swede	Central Experimental Farm.	2,000
Monarch..	Experimental Farm, Nappan, N.S.	7,000
Canadian Gem.	Experimental Station, Kentville, N.S.	18,000
Kentville Green Top.	Experimental Station, Kentville, N.S.	8,000
Carter's Imperial.	Experimental Station, Ste. Anne de la Pociere, Que.	900

CARROTS.

Danish Champion...	Central Experimental Farm.	900
White Intermediate...	Experimental Station, Summerland, B.C.	3,000
White Belgian...	Experimental Station, Sidney, B.C.	300

THE DIVISION OF POULTRY

THE DISTRIBUTION OF DAY-OLD CHICKS

BY F. C. ELFORD, DOMINION POULTRY HUSBANDMAN

WE shall this year distribute day-old chicks on a limited scale from a number of the branch Experimental Farms and Stations. Such of these will be chosen as are situated in districts where

day-old chicks cannot be otherwise obtained. As soon as breeders or commercial hatcheries in the vicinity of these stations are able to supply the demand for day-old chicks we shall discontinue the distribution.

THE ENTOMOLOGICAL BRANCH

THE EUROPEAN CORN BORER, *Pyrausta nubilalis* Hübner.

A NEW AND MOST DANGEROUS PEST.

BY LEONARD S. M'LAINE, M.SC., DIVISION OF PLANT INSPECTION

THE European Corn Borer, one of the most dangerous insect pests that has ever been introduced onto this continent was discovered in the vicinity of Boston, Mass., in July, 1917. The exact date of its importation is not known but it is surmised to have been five or six years ago, presumably in a fall or winter shipment of raw hemp consigned to a cordage company in one of the Boston suburbs. As the hemp was not used immediately, the hibernating caterpillars within the stalks pupated in the following spring and the adult moths migrated to the neighboring market gardens which abound in the vicinity and which had sweet corn in abundance. The area infested in Massachusetts at the present time covers approximately four hundred square miles. In the latter part of January, 1919, the insect was reported in Schenectady county, New York, and had apparently spread over two hundred square miles before its discovery in that state.

HISTORY IN THE OLD WORLD

This insect is well recorded in the foreign literature but the details of its life-history and methods of control are lacking. It has a wide distribution and is reported as occurring in central and southern Europe; west, central and northern Asia, and Japan. Corn, hemp, hops and millet are stated as being the principal food plants in the old world. In central Europe when these crops are attacked by this insect, less than fifty per cent. of the normal yield frequently results.

HISTORY IN THE UNITED STATES

Although the European Corn Borer is a comparatively recent invader its list of host plants already recorded in the United States is by no means small. This includes Sweet corn, field corn, fodder corn, celery, beans, potatoes, tomatoes, swiss chard, beets,



HOLES IN THE STALKS OF INFESTED PLANTS WITH SAWDUST-LIKE MATERIAL ISSUING FROM THEM, INDICATE THE PRESENCE OF THE BORER. (Reproduced by courtesy of U.S. Bureau of Entomology.)

spinach, dahlias, gladioli, sun flowers, chrysanthemums, oats, barn yard grass, fox-tail grass, rag-weed, pig-weed, and burdocks. Corn is the most

favoured food plant, but the fact that it is able to feed and survive on so many other species of plants complicates the problem of its control a very great deal; in fact it almost assures the establishment of this pest in any new locality into which it is introduced.

eggs on the underside of the leaves of the host plants, in masses of from five to fifty eggs each; the average number of eggs laid by moths of this generation is three hundred and fifty. The eggs hatch in a few days and the young caterpillars begin to feed at once and grow rapidly. The



CORN STUBBLE. THE CATERPILLARS HIBERNATE IN TUNNELS IN ALL PORTIONS OF THE PLANT. PULLING AND BURNING INFESTED PLANTS IS THE ONLY REMEDY TO CONTROL THIS PEST. (Reproduced by courtesy of U.S. Bureau of Entomology.)

LIFE-HISTORY

The European Corn Borer passes the winter as a full-grown or nearly full-grown caterpillar within the tunnels of the host plant; it resumes feeding with the advent of warm weather in April and May and changes to a reddish-brown pupa about the middle of the latter month. The adult moths emerge about the first week in June and are nocturnal in their habits. The females deposit

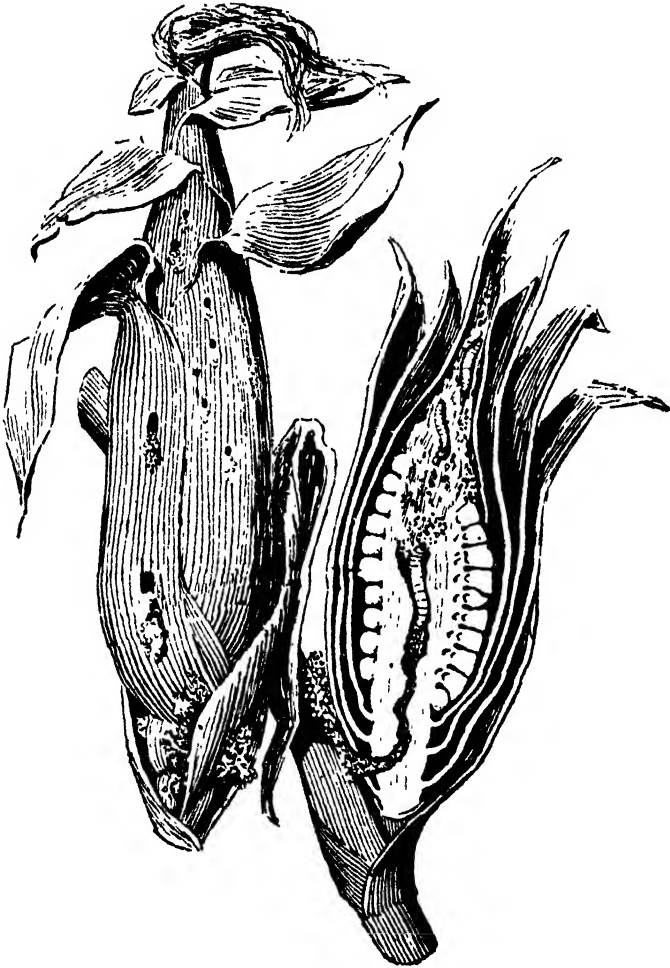
average larval life of this first generation is forty-four days and the pupal stage lasts approximately eight days. Consequently the moths of the second generation appear the latter part of July or early August. These moths lay about six hundred eggs, and it is the caterpillars hatching from these eggs that do the most serious damage to the crops.

When full-grown, the caterpillar is about one inch long with a yellow-

ish-grey coloured body and a flat dark brown coloured head. A transverse row of four light coloured spots with two smaller ones immediately behind them are found on each abdominal segment. From each of these spots a single short hair arises.

DAMAGE TO CROPS

The habits of the young caterpillars vary accordingly to the host plant attacked. In the case of corn, the newly hatched larvæ feed first upon the epidermis of the leaf, as they



INFESTED EARS, SHOWING LARVAE AT WORK WITHIN THE COBS. THE BORER ENTERS THE EAR THROUGH THE HUSK AS WELL AS THE STEM OF THE COB. (*Reproduced by courtesy of U. S. Bureau of Entomology*)

The male moth is slightly smaller than the female moth which measures a little over an inch in width when the wings are spread. It is a dusky yellow in colour, the male being considerably darker than the female.

grow larger and more vigorous attack the stalk and finally tunnel through all parts of the plant except the fibrous roots. The tunneling of the tassel causes it to fall over and frequently defective fertilization results.

The cobs are also subject to attack, as many as fifteen caterpillars having been found within a single ear, thus making it unfit for human consumption. The frequent tunnelling of the caterpillars considerably weaken the plants and make them susceptible to various rots which reduce the stalks and ears to a putrid mass and render them unfit even for stock feed.

Field counts for caterpillars in badly infested fields have shown 100 per cent. of the ears to be infested. As many as 311 larvæ have been collected in one hill of corn, and 117 in a single plant. In one field an average of forty-six caterpillars per plant were found, or a total of one million and fifty thousand to an acre.

MEANS OF SPREAD

Although the female moth is capable of flight, it has been established that it does not fly any great distance and that the chief danger of it being introduced into new localities is from the transportation of infested plants or parts of plants. These include corn stalks, for packing materials or stock feed, seed corn on the cob, corn cobs, and in summer sweet corn on the cob. There is also danger of this insect being spread by being shipped in some of its other food plants, such as celery, swiss chard, beans, spinach, cut flowers such as chrysanthemums, etc.

MEANS OF CONTROL

The only effective means of control known at the present time is by burning all infested plants. Cutting infested stalks and weeds is not sufficient, they must be pulled out by the roots. The caterpillars winter in their tunnels in all parts of the plants; these are often just above the roots and too close to the ground to be cut by a scythe or bush-hook. Ploughing under infested stalks or stubble is ineffective. Experiments have shown that the insects will work their way

up through twelve or more inches of soil. Furthermore the over-wintering larvæ can withstand almost any extreme of cold, heat or drought and the old cornstalks discarded by cattle and thrown into the yard are just as dangerous as those left standing in the fields. The same also applies to corn on the cob, either for stock feed or hung up to dry and mature for seed; the old cobs if not burned are a source of danger.

ACTION TAKEN BY THE UNITED STATES GOVERNMENT

Although the cost of carrying out these control measures is extremely high, the United States authorities realize the grave danger of the European Corn Borer spreading into the middle west and seriously affecting their greatest crop. They are exerting every effort not only to control this pest but also to bring about its extermination by burning all infested plants within its present habitat. Furthermore, strict quarantine regulations have been enacted which prohibit the transportation of infested plants or plants liable to be infested from infested areas to non-infested territory.

PRECAUTIONS TAKEN BY THE DOMINION GOVERNMENT

The Dominion Department of Agriculture realizing the seriousness of this pest and the danger of its invading Canada, is tracing up shipments of corn on the cob and other susceptible plants imported into Canada from the infested areas in New York and Massachusetts. A thorough inspection is also being made in several localities where it is suspected that this pest may have been imported accidentally. In order to awaken the individual to the seriousness of this new menace, a warning poster has been issued and distributed to all banks, post offices, railroad stations, newspapers, schools, etc., in Eastern Canada. Legislative quarantine measures are also pending.

THE LIVE STOCK BRANCH

PURCHASE AND DISTRIBUTION OF FEEDING STUFFS

BY R. J. ALLEN, CHIEF, FEED DIVISION

SINCE the latter part of November, 1917, the Feed Division of the Dominion Live Stock Branch has been engaged with the purchase and distribution of feeding stuffs. This procedure was necessary owing to the extreme shortage of feeds, which, during the war, was more or less general throughout the Dominion, and definite action in the way of providing a solution for the problem was necessary in order to prevent the liquidation of considerable breeding stock and also the marketing of many animals in an unfinished condition. The efforts of this Division, considering the difficulties which had to be overcome, were attended with an unusual degree of success, and many districts suffering from an acute feed shortage were given the much needed assistance.

The work of the Feed Division may be briefly classified as follows:—

1. To provide as far as possible, for an equitable distribution of all feeding stuffs available in the country.

2. To prevent the exportation of feeds produced in Canada, principally bran and shorts, by co-operating with the Canada Food Board to this end.

3. To arrange for the purchase and importation of concentrates from the United States, and their subsequent sale and distribution to Canadian feeders.

In this way a considerable quantity of feed has been made available, and the live stock industry has benefited considerably as a result. In this work the Feed Division has received the hearty co-operation of the various provincial Departments of Agriculture, without whose aid it would not have been possible to have accomplished the desired end. The provincial departments have advised the farmers in those districts, where feed shortage was most apparent, of the availability of the feeds handled, and in this way have encouraged feeders to make use of the service offered.

The following table indicates the amount of the various feeds handled by this Division to date, which represent a money value approximating two million dollars.

	Quantity Purchased	Quantity Distributed	Balance on Hand
Bran..	1,978.5 tons	1,978.5 tons	0
Shorts and Middlings ..	450 tons	450 tons	0
Recleaned Elevator Screenings . .	17,719 tons	11,219 tons	6,500 tons
Corn.	359,338 bush.	350,164 bush	9,174 bush.
Linseed, Oilcake and Oilcake Meal.	12,613.5 tons	12,613.5 tons	0

It will be noted from the foregoing table that only a comparatively small quantity of bran and shorts was handled. The reason for this is that shortly after the feed situation became critical, action was taken by the Canada Food Board to prevent the exportation of bran and shorts, and consequently there was no further need of their purchase by the government in order to retain them in Canada.

With regard to screenings, it may be stated that previous to the war this product was practically unknown to Canadian feeders. However, the activity of the Live Stock Branch, through the Feed Division, in distributing over eleven thousand tons of this material, has resulted in popularizing the product, so that screenings now have a place on the Canadian market, and are recognized by feeders as a valuable feed for practically all classes of live stock.

Since the signing of the armistice, the feed situation has been greatly relieved, and normal conditions are rapidly being restored. This is largely to be accounted for by the mild open winter we have just passed through. It is now expected that the demands of the majority of our feeders can be satisfactorily handled through the ordinary channels of trade, and in this way the Feed Division will be relieved from making further purchases. However, this Division has still on hand a considerable amount of screenings to be disposed of, and these are being offered at twenty-five dollars (\$25), per ton, unground in bulk, or at thirty-two dollars (\$32) per ton, ground and sacked, f.o.b. Fort William. It is expected that these will sell very quickly, as at the prices quoted, they are exceptionally good value.

The government of Manitoba has set apart May 12th as Arbor Day which was proclaimed a public holiday on which the citizens were urged to plant forest and other trees. Municipal, religious, and school organizations were requested to assist in carrying out the objects for the attainment of which this holiday was instituted. The proclamation was marked by the distribution and display in public places of a large poster.

PART II

Provincial Departments of Agriculture

CO-OPERATIVE BUYING AND SELLING

It was not until Denmark had successfully grappled with the merchandising end of the farmers' business that the agricultural industry assumed a prosperous condition. The Canadian farmer is rapidly learning the value of co-operation in the selling of farm products and in purchasing farm requirements. The progress of this work in Canada has been dealt with from time to time in these pages. The April number of 1917 and the May issue of a year ago presented the situation as it existed in most of the provinces. Since then progress has been even more rapid more especially in the older parts of Canada. In this issue the situation is again presented affording provincial officials an opportunity to study each other's methods with a view to a standardization of co-operative merchandising methods.

PRINCE EDWARD ISLAND

BY J. L. TENNANT, B.S.A., AGRICULTURAL REPRESENTATIVE

THE co-operative system of marketing farm produce and of purchasing farm supplies has developed quite rapidly during recent years in Prince Edward Island. The biggest organization operating along this line is the Prince Edward Island Co-operative Egg and Poultry Association, Limited, with head office and warehouse at Charlottetown. This organization began business in 1914, has today 3,300 members, and is financed by means of capital notes of \$20 per member. Its chief activity is the candling, grading and marketing of eggs. Some poultry is handled during the fall and early winter, and feed supplies have been purchased for its members. In 1918, approximately 900,000 dozen eggs valued at \$350,000 were sold through the association. This is one-half of the total production of eggs in the province. The association pays a flat price to members for eggs and poultry at the time of delivery to the candling station. At the end of the year the profits are pro rated according to the business done by each member.

As a result of the success secured by the Egg and Poultry Association,

another co-operative organization called the Canadian Farm Products, Incorporated, was organized for business in the fall of 1918. The company has a Dominion charter. The head office is at Charlottetown, and it is the intention to establish branches at other points.

This corporation has no share capital, but it has power to accumulate and create a capital fund equal to the cost price of the total real estate, property and equipment of the corporation. This capital fund is apportioned among the branches in proportion to the amount of business done through the corporation during the year in which the fund was raised. A certificate is issued to each shareholder, which is a guarantee to him that his pro rata share of the capital fund shall be returned to him in cash on a date specified on the face of the certificate. This re-payment is not made until the fund for the year following is collected, and the business of the year in which such later collection is made has been concluded.

The Farmers' Union Co-operative Society, Limited, Wellington, was organized in 1916 and has 110

members. Shares are \$10 each, but each member has only one vote, no matter how many shares he may hold. This society operates a retail general store in Wellington, has a warehouse with railroad siding facilities, purchases supplies, and sells farm products, except live stock, for its members. The profits are prorated at the end of the year according to the amount of business done.

MARKETING WOOL

In 1915 the first attempt to market wool co-operatively was undertaken through the agricultural representatives. In 1915, 5,000 pounds were graded and sold co-operatively; in 1916, 28,000 pounds; in 1917, 24,000 pounds, and in 1918, 53,000 pounds. The amount sold in 1918 is valued at \$39,750 and is about one-seventh of the total clip of the province. In 1915, 1916 and 1917 the wool was graded and then sold by tender. After the sale was made a cheque for the value of his wool, less proportion of the expenses, was sent to each grower. In 1918 the marketing was handled through the Canadian Co-operative Wool Growers. A payment of forty cents per pound was made on account on delivery of the wool to the warehouse and

the balance, less expenses, was paid after the wool had been sold.

FARMERS INSTITUTES

There are 59 Farmers' Institutes in the province, nearly all of which have done a limited amount of co-operative buying for their members in one or more of the following lines—feed, fertilizers, seeds, spray materials, etc. There are no figures available to show the amount of business done, but in the aggregate it would be quite large. The goods are usually ordered through the secretary, and each member pays cash on delivery, including freight and other charges. A number of institutes have adopted the practice of selling their lambs co-operatively in the fall. Tenders are called for. The successful bidder or his representative is present on the day the lambs are delivered to the shipping point, and as each member delivers his lambs, he receives payment for them. One institute did a business in lambs of \$14,000 in 1918.

No co-ordination of the activities of the various co-operative organizations has been attempted, but the movement of The Canadian Farm Products to establish local branches will probably tend in this direction.

NEW BRUNSWICK

BY J. H. KING, B.S.A., AGRICULTURAL REPRESENTATIVE

THE AGRICULTURAL SOCIETIES UNITED

THE Agricultural Societies United is an incorporated organization of the agricultural societies of the province, formed for the purchase of chemical fertilizers for the agricultural society membership in wholesale quantities at cost plus expenses. Each society pays an annual membership fee of \$5, and is required to send in its orders within a stated time. A number of agricultural societies also purchase fertilizers and feeds independent of the United Societies.

THE UNITED FARMERS

The United Farmers of New Brunswick organized a head office at Woodstock late in 1917, with a branch at Sackville. Other branches were formed during the past winter in different parts of the province. The company is incorporated and issues shares valued at \$25 each.

The association purchases staple lines of goods used by farmers and ships live stock and other farm products. Members are paid cash for their products, while the profits made are to be paid in the form of dividends on the stock.

THE FARMERS' CO-OPERATIVE CREAMERY

The Farmers' Co-operative Creamery, Limited, is capitalized at \$25,000, of which \$10,500 has been issued in \$25 shares bearing 6 per cent interest. The number of shareholders is 156, chiefly farmers.

Patrons supply cream only, which is paid for on the butterfat basis.

The company makes a charge of five cents per pound for manufacturing, or, if the cream is sold, an equivalent charge is made. The balance over and above running expenses is divided among the shareholders.

QUEBEC

BY REV. J. B. ALLAIRE, ORGANIZER, CO-OPERATIVE AGRICULTURAL SOCIETIES

MOST of the agricultural co-operative associations in Quebec were organized since 1914, under the "Quebec Act of Co-operative Agricultural Associations" (1908), and almost all of them are designated by the name of the district in which they were formed. In 1915, they began to unite in district federations such as the St. Hyacinthe and Three Rivers federations, and, later, left this grouping into district federations to form a single provincial body, under the name of "The Federation of Quebec Agricultural Co-operative Associations". This central association which was inaugurated on December 22, 1916, includes to-day 91 affiliated associations, in 36 different counties, from Gaspé to Temiscamingue.

The products purchased by these associations are chiefly cattle feed, seeds, coal, binder twine, insecticides, agricultural machinery, and the products sold, mainly live stock (beef, hogs, fowl) alive or slaughtered, eggs and wool.

The associations supplying the most eggs and fowls are those of Shefford, St. Hyacinthe and Bonaventure counties; of live stock, those of Megantic and Arthabaska counties; of wool, those of Eastern Townships.

Among those who spend most in the purchases, there are the Associations of Ste. Helene (Kamouraska), St. Sebastien (Iberville), La Baie (Yamaska), Vercheres, St. Valerien (Shefford) and St. Antoine (Vercheres).

All these affiliated co-operative associations are incorporated and operate under the Act, with the same regulations, under the supervision of the provincial government. There are, in addition, 150 other associations, not affiliated, operating separately, all forming various groups. Too little is known about the latter to speak about them.

The federated associations do all their business on a cash basis and only purchase or sell on commission; they never keep goods in stock.

As a rule the amount of paid-up subscribed capital is not large. The shares are only \$10 each, and each member has only one share, but all have made arrangements with the banks so as to procure the money necessary to cover the delays that may occur, for instance, between the arrival of a car and the payment of the contents of such car by the purchasing members.

The secretaries are not on salaries; they raise a certain percentage for the association on each transaction, purchase or sale, after paying all the expenses of handling, and at the end of the year, when the accounts are settled, they are voted by the general assembly a remuneration, in proportion to the benefits of the association and of the interest they have shown. It is, indirectly, a salary. As for the percentage to be levied on the transactions, it is fixed in each case by the executive, always composed of five members. It is about 2 per cent on an average.

Each local or parochial association

counts an average of one hundred members, and the general turnover for all of them amounted last year to about \$450,000; it is impossible to give an exact figure as all the associations have not as yet submitted their last annual report. The turnover for each association varies.

In addition to purchases and sales, the associations also do a great deal of educational work in agriculture for their members; a number of educational meetings are held for the purpose especially during the winter.

The agricultural federation is a rallying centre for all these associations and for all purposes. A general meeting is called for the second Wednesday of each month and a programme of operations is made up at this meeting. To make sure that farmers will always be in the majority, it is stipulated in the regulations that only one private individual may be admitted as member against two associations. By this measure, the association loses capital that it might have, but it is sure of never falling into hands foreign to agriculture.

ONTARIO

BY WM. B. VARLEY, ASSISTANT UNDER THE AGRICULTURAL INSTRUCTION ACT

AN attempt has been made in the ensuing survey to indicate the nature of the various farmers' trading organizations carrying on business in the province of Ontario, the nature of the business, and the methods employed in its conduct. The information on which the survey is based was obtained through the agricultural representatives of the provincial Department of Agriculture, supplemented from other sources. Of the forty-seven counties and districts in the province, particulars more or less incomplete, were obtained from twenty-six. Owing to the somewhat fragmentary nature of the data, no accurate system for classifying and tabulating the information was found to be practicable. At the same time the replies received indicate in a general way the limits of the present development of co-operative buying and selling in the province, and to that extent will be useful to those interested in the subject.

For the promotion and guidance of farmers' co-operative enterprises, the Ontario Department of Agriculture, some few years ago, organized a Co-operation and Markets Branch with a director at its head, employing a portion of the Agricultural Instruction grant to meet the expenses connected therewith. This Branch

has done what it could, assisted by the agricultural representatives, to foster and encourage the movement and to direct it along sound and business-like lines.

The following general classification of trading organizations is indicated by the returns received:—

(1) The Farmers' Clubs and associations of farmers for buying commodities in wholesale quantities and for making combined shipments of their products.

(2) Associations primarily engaged in shipping live stock and live stock products.

(3) Associations of breeders for the disposal of pure-bred beef and dairy cattle.

(4) Associations for the marketing of fruit, vegetables and special crops, and for the purchase of supplies.

FARMERS' CLUBS AND KINDRED ORGANIZATIONS

Farmers' clubs, of which there are from 400 to 600 in the province, comprise associations of farmers, unincorporated for the most part organized for the purchase of supplies in wholesale quantities, and, to a less general extent, for the sale of their products. In some instances the aims of such clubs are limited to social and educational activities. The sup-

plies purchased consist chiefly of goods that are not readily perishable, such as mill feeds, oil cake, binder twine, flour, salt, coal, clover seed, and similar articles. Many clubs experienced more or less difficulty during the war in purchasing supplies owing to price fluctuations and the scarcity of commodities. In some instances clubs ceased buying for the time being and turned their attention to selling with good results. The commodities sold usually consist of cattle and hogs, and, occasionally, of wool, potatoes and hay.

As a rule clubs of this character are unincorporated but quite generally they are affiliated with the United Farmers of Ontario, an incorporated company having local branches in many districts. In cases where such affiliation exists the United Farmers constitute the medium through which the clubs transact their business.

The combination of the clubs of a county under one management has been effected in some instances. In Victoria county six clubs co-operate in this way, having a combined membership of 425. Cattle and hogs are shipped, the business in hogs alone was approximately \$240,000 for the year.

There are twenty clubs in Grey County, one is incorporated, has a membership of 327, and last year sold \$263,000 worth of live stock. The other clubs are not incorporated, but one shipped hay and live-stock to the value of \$380,000 last year, while the business of the others ranged from \$60,000 to \$125,000.

Middlesex County has thirty-five farmers' clubs engaged in buying and selling. Several of them do over \$50,000 worth of business, while two have bought and are operating stores and elevators.

Manitoulin Island has thirteen clubs engaged chiefly in the purchase of supplies, and two associations for the sale of live-stock and wool. Of the latter, the Manitoulin Co-operative Association is incorporated doing a

business of \$50,000, while the Southern Manitoulin Wool Growers' Association handles wool and lambs to the amount of \$25,000.

Taken altogether, there are upwards of 200 clubs and associations in the province engaged in shipping live stock.

HOW CLUBS ARE FINANCED

The shipping of live stock co-operatively has got well under way in many parts of the province. Through the United Farmers' Clubs about one thousand cars of live stock valued at perhaps three million dollars, were marketed co-operatively by members last year. The supplies purchased by clubs and co-operative associations are usually financed by the local banks on the security of members' promissory notes. In such cases, members' notes, each, say for fifty dollars, are deposited with the bank and drawn against. The goods are paid for by the member in cash at the car, and the money is returned to the bank. Interest is charged during the time the funds are in use. The procedure in some instances varies somewhat from that given. In Halton county, for example, where each member pays \$5 for a life membership, the business is financed from the fund thus created. Five per cent is added to the cost of the goods to cover charges, including the managers' two and one-half per cent commission, and any surplus is rebated. In some clubs, purchases are financed by directors' notes. The simplest form is where members purchase on a cash with order basis.

In cases where commodities are consigned to a commission house for sale, no reserve capital is actually necessary, provided members are willing to wait until proceeds are remitted. This is the plan followed in the majority of cases. When, however, the members demand cash at point of shipment, some arrangement must be made with the bank to finance transaction. Where the association has no paid up capital, individual notes are given, as in the

case of purchasing. The manager then pays for the live stock on delivery, reserving enough to cover charges. Any surplus is afterwards divided pro rata. The Thunder Bay Co-operative Marketing Association, for example, pays fifty per cent on delivery, and the balance when returns come to hand. Each member gives his note for fifty dollars on joining the association.

Managers' commissions are usually on the basis of a one and one-half per cent on the selling price of the stock sold, or at the rate of so many cents per head. The insurance is sometimes carried by the club as in the case of the Rocklyn and Victoria Clubs in Grey county, which collect fifteen cents per head for cattle and five cents for sheep and hogs.

A good example of a co-operative association doing both buying and selling is that of the Norfolk County Association organized early in 1918, with a membership of 250. This organization has since purchased bran, shorts, oil cake and other feeds in car lots, besides seeds, fertilizers, spray materials and poultry supplies. Vegetables, tomatoes, strawberries and raspberries were shipped. The association is financed by each member giving a demand note for \$100 renewable every three years. All goods are paid for in cash. Any one, whether a member or not, may buy through the association, but only the members participate in the profits, which are divided in proportion to the business done by each.

BREEDERS' ASSOCIATIONS

There are several breeders' clubs in the province, the members of which sell their surplus animals by public auction. In Brant county, there are three clubs of this description, consisting of Holstein, Jersey and Short-horn cattle breeders respectively. The membership ranges from fifteen to thirty. The Holstein Club sells about \$15,000 of pure-bred cattle annually.

FRUIT AND SPECIAL CROP GROWERS

These comprise associations of commercial fruit and vegetable growers, apple growers and pure seed growers. In the Niagara district, there are seven active co-operative associations of fruit growers, besides three or four others that are more or less quiescent at the present time. The active associations consist of the Vineland Fruit Growers, the Grimbsy Fruit Growers, the St. Catharines Cold Storage Company, and the Niagara Fruit Company of Queenston. The aggregate receipts from sales are estimated at \$500,000 annually, Vineland contributing more than half of this total.

In the counties of Essex, Kent and Lambton there are a number of vegetable growers' associations, while associations of apple growers are quite numerous in the leading apple districts. There is also the Co-operative Fruit Growers of Ontario, a united company organized for marketing the fruit of the locals. About eighteen locals are thus united. During the war activities practically ceased but steps are now being taken to revive the work. Associations of this character employ a manager to market their output and to purchase containers, spraying materials, seeds and fertilizers. The methods adopted for conducting the business are similar to those already described. In some instances, members are paid when the returns come in. In other cases they are paid at the end of the season the amount realized less cost of handling. The returns are pooled in the case of some of the apple growers' associations.

Seed circles for the production and sale of registered seed, and egg circles for the co-operative marketing of eggs are other forms of association relating to special departments. Kenora district, for example, has a Clover Seed Growers' Association doing a business of about \$15,000. Members are paid \$10 per bushel on account after the seed is cleaned and

graded and the balance at the close of the season.

INCORPORATION DESIRABLE

Previous to 1916, the Ontario Companies Act contained no provision for the incorporation of co-operative companies. This omission has since been remedied by including such companies within the terms of the Act.

Mr. F. C. Hart, Director of the Co-operation and Markets Branch of the Ontario Department of Agriculture gives the following reasons why he regards incorporation as desirable:—

(1) An unincorporated club, having no legal status, is apt to meet with difficulties should occasion arise for an appeal to the courts in connection with the collection of debts, or the settlement of any legal difference.

(2) In unincorporated companies the liability of members is unlimited. The organization being a co-partnership, each member is liable for all the debts of the concern. Incorporation limits liability to the amount of the members' subscribed shares or capital notes.

This will no doubt explain the reason for the mistrust mentioned by one representative of any scheme of raising funds by promissory notes.

(3) The difficulty experienced in determining the legal ownership of property acquired by unincorporated associations, such as real estate, buildings or shares acquired in another company. So long as no untoward events arise, lack of incorporation may not be a disadvantage. If they do occur, however, they are augmented by the fact that an unincorporated association is regarded by the courts as legally non-existent.

BRITISH COLUMBIA

CO-OPERATIVE buying by farmers is carried on in British Columbia to some extent by Farmers' Institutes. In the *Agricultural Journal* for April the activities of the Robson Farmers' Institute are published and constitute an example of the methods employed. This institute in September, 1913, bought feed and flour in mixed cars and have done so ever since. While the buying is done through the institute the accounts for purchases are kept separate from the regular institute funds. A carload or so is ordered about every eight weeks. The system employed is to secure prices from the milling interests and send with these a form to each member to be filled in with what they require. On the arrival of the goods the members are notified to come and

take delivery of what they have ordered. If more is secured than was ordered by members it is taken to a warehouse and stored. Three per cent is added to the invoice price, two per cent is awarded the secretary for his work and one per cent to cover any incidental losses. To finance the transaction most of the cash is collected before the arrival of the car. If purchasers are unable to pay for feed when it arrives, sufficient is procured from a chartered bank to meet the obligation, the member paying the interest until the loan is returned. Last year nine cars of feed, costing \$11,000 were purchased co-operatively by this institute. These purchases included a certain amount of hay and straw for which a charge of only two per cent was made.

QUEBEC

AGRICULTURAL LEGISLATION

THE provincial legislature at its latest session passed an act providing for the inspection of breeding stallions. The Council of Agriculture may appoint a special committee of not less than three nor more than five persons to constitute the Stallion Inspection Board. Under the act the Minister is authorized to appoint competent inspectors who will work under the direction of the inspection board. Stallion owners are required to declare their stallions before the first of May each year. These horses shall be presented for

inspection by the inspection board who will (a) classify the inspected stallions in such a way as to inform the public of their value; (b) keep a register containing the description, classification, name of the owner of each stallion, and any other details deemed necessary; (c) grant or refuse permission for service. Stallion owners not satisfied with the decision of the inspectors may appeal to the inspection board and at the same time deposit a sufficient amount of money to cover the cost of the re-inspection, which shall be final.

APPROPRIATIONS FOR THE FISCAL YEARS OF 1918-19 AND 1919-20.

	1918-19.	1919-20.
	\$ cts.	\$ cts.
Agricultural Societies.....	183,000 00	100,000 00
Farmers' Clubs, encouragement of agriculture in general, land clearing competitions, lectures on agriculture, etc.....	305,000 00	200,000 00
The Agricultural and Horticultural Society of Montreal.....	500 00	500 00
Pomological and Fruit Growing Society of the Province of Quebec.....	500 00	500 00
Council of Agriculture.....	3,000 00	3,000 00
Agricultural Schools.....	43,000 00	35,000 00
Veterinary Instruction.....	6,000 00	6,000 00
House-keeping Schools (Ecoles menageres).....	21,000 00	15,000 00
Dairy Association of the Province of Quebec.....	2,000 00	2,000 00
Dairy School of St. Hyacinthe, and working of farm.....	20,000 00	10,000 00
Dairy Industry and inspection of factories for the manufacture of dairy products.....	127,000 00	107,000 00
Horticulture.....	8,000 00	6,000 00
Official Laboratory of the Province of Quebec.....	5,000 00	3,000 00
Journal of Agriculture.....	27,000 00	27,000 00
Aviculture.....	7,000 00	5,000 00
Provincial Agricultural Merit.....	6,000 00	4,500 00
Exhibitions.....	34,000 00	32,000 00
Totals.....	\$798,000 00	\$ 556,500 00

NOTE.—The amounts shown in the column for 1918-19 include the general amounts for the fiscal year ending June 30, 1919 voted that year plus the supplementary votes for the same year passed at the present session.

MACDONALD COLLEGE

CHANGES IN MACDONALD COLLEGE STAFF

DURING the past few months, owing to the return of officials from overseas service and the resignation of a number of men, several changes have been made in the staff of Macdonald College as follows:—

Professor James Murray's resignation as Professor of Cereal Husbandry, Macdonald College, took effect on March 31. He has accepted a position with the Noble Foundation, Ltd., Nobleford, Alta.

Professor Murray, as Professor of Cereal Husbandry, has been succeeded by Mr. Robert Summerby, B.S.A., who, for a number of years, had been lecturer in that department.

Mr. J. Vanderleek, Ch.É., has resigned his position as lecturer in Bacteriology, and taken up work with the Canadian Milk Products Co., Toronto.

Mr. A. Grant Lochhead, B.A., M.Sc., who has just returned from Germany—where, at the commencement of the war and on the conclusion of his studies, he was taken civil prisoner of war,—has joined the staff of the Bacteriology Department.

Professor W. P. Fraser, M.A., has resigned his assistant professorship in

biology, in order to give his full time to his investigations for the Dominion Department of Agriculture of the rust problems of the West, with headquarters at Saskatoon, Sask.

Mr. A. R. Ness, who has recently returned from overseas war service, has resumed his duties as Lecturer in Animal Husbandry.

Mr. L. C. McOuat, who has recently returned from overseas war service, has resumed his duties as Lecturer in Animal Husbandry.

Mr. N. C. MacFarlane, B.A., having just returned from overseas war service with the Princess Patricia's Canadian Light Infantry, has resumed his duties as Instructor in Chemistry, under THE AGRICULTURAL INSTRUCTION ACT. During his absence his place was filled by Mr. G. J. Van Zoeren, A.B., who has taken a position with The Holland Aniline Dye Co., Holland, Mich.

Miss Laura Kirby has been appointed Demonstrator to the Homemakers' Clubs of Quebec, under THE AGRICULTURAL INSTRUCTION ACT.

Miss Florence A. Buzzell has been appointed Assistant Demonstrator to Homemakers' Clubs of Quebec, under THE AGRICULTURAL INSTRUCTION ACT.

ONTARIO

AGRICULTURAL REPRESENTATIVE ACTIVITIES.

CO-OPERATIVE MARKETING.

THE agricultural representatives of the Ontario Department of Agriculture are closely identified with the co-operative marketing movement. The representative at Fort William reports that the Thunder Bay Co-operative Marketing Association did business in seed potatoes alone last year amounting to \$10,000. At the annual

meeting it was decided to employ a business manager. In the Kenora district the Kenora Co-operative Dairy Association was organized and about \$6,000 raised on notes as collateral security. Application has been made for a charter of incorporation.

In Lincoln County the Beamsville Farmers' Club is reported by the agricultural representative to have passed a resolution giving the board

of directors authority to appoint a paid business manager. During the past year \$15,000 worth of business done by the club, in buying in car loads such products as feed, lime, coal, fruit, etc., was handled by the secretary without charge. They have decided to sell co-operatively this year.

In Peterborough County after a committee had looked into and reported upon the co-operative handling of eggs, arrangements were made to adopt this principle on the basis of 1c. per dozen paid to the manager. The representative reports that the co-operative shipping of live stock has spread rapidly throughout this county. Live stock is now shipped co-operatively from seven stations. The prices usually charged are 10c. for hogs, 25c. for calves and sheep, and 50c. for cattle. One-half of 1 per cent of all consigned is charged and this is placed in a reserve fund for meeting various expenses.

In Elgin County five clubs arranged to work together in their co-operative business and have appointed officers accordingly. A line of credit has been arranged with the bank by the giving of a note jointly signed. Wire by the car load, that was sold before it was purchased, has been brought in and distributed to the members.

LIVE STOCK JUDGING COMPETITIONS

A four weeks' stock judging course held by W. F. Strong, B.S.A., in Halton County was concluded with a final judging contest in which 39 of the 52 boys who attended the course competed for unusually valuable prizes consisting of pure bred animals. The prizes consisted of a Shorthorn bull calf, an Ayrshire bull calf, a Holstein bull calf, two Leicester ewe lambs, a Shropshire ewe lamb and a Yorkshire brood sow. Several of these animals were donated by public-spirited citizens in the county while the others were purchased by cash contributions of farmers' clubs. The animals were not designated for

any specific prizes but the choice was left to the winners from the first to the seventh in the order in which they stood, which was as follows:—1st, Shorthorn bull calf, 2nd, Yorkshire brood sow, 3rd, Leicester ewe lamb, 4th, Shropshire ewe lamb, 5th, Holstein bull calf, 6th, Leicester ewe lamb, and 7th, Ayrshire bull calf. A championship shield was also awarded to the highest standing competitor. A cup donated by the Bank of Toronto was awarded as a special prize to the competitor who stood highest in the high schools.

Fifty young men competed in the annual stock judging contest conducted by J. E. Steckley, B.S.A., in the county of York. Agricultural books to the value of \$15 were given as prizes to the boys standing highest in the contest who had never been on a stock judging team. For the boys winning the highest number of points the George S. Henry cup was given, which is open to all Junior Farmers in the county. There was also a special prize for the team of four from a local Junior Farmers' Association. The judging was carried out on four different farms where dairy cattle, beef cattle, sheep, swine, and horses were judged. Arrangements have been made by J. S. Knapp, B.S.A., for holding a county judging competition in Waterloo next autumn. Contestants will be required to judge beef and dairy cattle, sheep, swine, and horses for which prizes of \$5, \$3, and \$2, as well as 4th, 5th, and 6th place ribbons will be awarded in each class. Association competitions will also be held. The marks of the five highest members from each association will be totalled and the five that make the highest total will win the trophy for their association. Instead of canvassing for funds for prizes each association is expected to contribute \$10.

PLOUGHING MATCH RULES

Rules and regulations for local ploughing competitions in Waterloo

County have been decided upon as follows:—

1. This competition shall be known as the Ploughing competition.
2. All work in this Competition must be judged as best general farm work.
3. All men who have won first prize in a man's class at a recognized ploughing match are debarred as professionals.
4. Each man must have, at least, one strike and one finish.
5. There shall be one class only and contestant may plough any kind of land with any kind of plough except a hi h cut plough, and must plough at least five acres.
6. Ploughing must be done on the home farm or the farm where the contestant is working.
7. Entries close October 1, and ploughing to be ready for judging on November 1, and contestants should arrange to have their land ploughed as near the time of judging as possible.
8. All contestants must be members of the club or working for a club member.
9. The decision will be based on the following score card.—

General appearance.....	25 points
Straightness and evenness	25 “
Packing and jointing.....	20 “
Crown... ..	15 “
Finish	15 “
Total	100 “

AGRICULTURAL SECTION OF BOARD OF TRADE

While the Board of Trade at Woodstock has had an agricultural section, little had been accomplished through it until a new chairman was elected, who, in order to promote a better feeling between town and country, has prevailed upon the two nearest clubs to petition the managers of the banks in Woodstock to extend their banking hours on Saturdays from one to three o'clock. The bankers have responded to the extent of keeping open until two-thirty. Another matter being taken up by the farmers' clubs in Oxford county by the agricultural representative is the institution of a rest room for farmers and their wives who come into Woodstock to do business.

LINCOLN COUNTY

BY DAVID ELLIOTT, B.S.A.

AT a meeting of the Board of Agriculture it was felt in addition to agricultural meetings and live stock judging courses as held in the past, more aggressive work should be undertaken. A working executive was appointed to meet frequently to discuss and carry out plans for school fairs, the settlement of soldiers upon vacant land in the county and organization of cow testing and live stock breeding associations. The working executive was composed of one representative from each of the following interests:

1. Fruit and vegetable growers.

2. Mixed farmers and milk producers.
3. Women's Institutes.
4. Farmer's Clubs.
5. Township councils—preferably “The Warden.”
6. Agricultural Societies.
7. Public school inspector.
8. Junior Farmers' Improvement Association.
9. Poultry Associations.
10. The local G.W.V.A.

It was decided at the meeting to ask the St. Catharines Board of Trade to form an agricultural section and to allow the Lincoln Board of Agriculture to send one or two representatives to sit on the Board.

KENT COUNTY

BY J. L. DOUGHERTY, B.S.A.

EIGHT farmer's clubs in Tilbury township have adopted the unique plan of holding joint

debates. Each club is represented by two members. Each speaker is allowed ten minutes. The Township

Council gives \$10.00 for each of these debates divided into first, second and third prizes. Practical subjects are discussed, two of which were "The Best Method to Protect the Sheep

Industry from the Dog Nuisance" and "Is our Municipality prepared to take up the Permanent Good Roads System?"

WELLINGTON COUNTY

BY R. H. CLEMENS, B.S.A.

TO organize a satisfactory class in Home Nursing and First Aid to be held in the town of Arthur, the course was advertised in the local paper, but what proved of greater value was the supplying of merchants in the town with blank

books with lead pencils attached which enabled women wishing to take the course to inscribe their names. By this system more than one hundred applicants were received in the course of a few days.

LAMBTON COUNTY

BY W. P. MACDONALD, B.S.A.

THIS year we amalgamated the corn show, poultry show and a sale of live stock, forming a very successful winter fair which was held during three days at the town of Petrolia. On the evening of the second day the Women's Institute prepared a banquet, or more correctly, a directors' luncheon, to which were invited the members of the county council and town council, the

board of trade and all the contributors of the stock and the directors of the shows and sale. So great was the success of the fair that we are likely to secure a building large enough to adequately accommodate an annual event of this character. Such a building, it is anticipated, will be suitable for a market and a shed for other purposes during the year.

RENFREW COUNTY

BY M. H. WINTER, B.S.A., AGRICULTURAL REPRESENTATIVE

TWO short courses in domestic science were held in Renfrew county during the past winter. Both were conducted by Miss Muriel M. Foote, of Drayton, Ontario, under the supervision of Mr. G. A. Putnam, Superintendent of Women's Institutes. One of these was held at Renfrew and the other at Pembroke, and in each case a series of ten lectures were given. These were held in the afternoons from two-thirty to four o'clock, and in the evenings from seven-thirty to nine o'clock. At Renfrew the attendance was 79 women and girls from the town and surrounding country. At Pembroke the attendance was 150. At the

latter point the course was conducted under the auspices of the Local Council of Women who secured from fees, above expenses, the sum of \$36.35, which was granted to the Great War Veterans Association.

Farmers in the vicinity of Beachburg in Renfrew County have organized a Horse Breeders' Club thereby taking advantage of the assistance afforded by the Federal Department of Agriculture. The Club commenced with a membership of 68. There has been secured on a rental basis a Clydesdale stallion, Royal Design No. 17286 owned by Messrs. Smith and Richardson of Columbus, Ont.

HARDINESS IN FRUIT TREES.

IN a discussion of means of reducing winter losses in tree fruit orchards, in Fruit Branch Circular of the Ontario Department of Agriculture for March, Professor J. A. Neilson of the Ontario Agricultural College recommends plant breeding in the following paragraph:—

“Fruit growers everywhere are asking the question,—What can we do to prevent a recurrence of the losses of the past winter? (1917-1918). This problem is not easy to solve as we have no reasonable assurance that similar climatic conditions may not return and cause further losses. Until we can produce by plant breeding and selection, good varieties that are hardier than any we now have, we cannot hope to escape some loss by winter killing. This work is of necessity very slow and cannot be undertaken with the hope of immediate returns by the fruit

grower. Work of this nature is under way at our provincial experimental stations, but in view of the losses which have been sustained during the past ten years and especially during the winter of 1917-1918, it should be carried on much more extensively than heretofore. The interest on the capital value of the fruit trees destroyed in Canada during that winter would adequately finance an undertaking of this kind. It is quite true that the present generation of fruit growers would not derive much benefit from this work, but we should not forget that we are now reaping the benefit of the labour of horticulturists who have gone before and if we are to do for others as we have been done by, we should continue this excellent work and do something for those who come after us.”

MANITOBA

A NEW DISEASE IN PARSNIPS

BY F. W. BRODRICK, B.S.A., PROFESSOR OF HORTICULTURE, MANITOBA AGRICULTURAL COLLEGE

CONSIDERABLE loss has occurred in the parsnip crop grown at the Agricultural College owing to the development of a disease in the roots, which, for want of a better name, has been called parsnip canker. This disease develops on the roots causing a black, wart-like growth, which finally sets up a decay which destroys the whole root. Roots badly affected with this growth were found to be covered with moulds and other fungus growths. No evidence of decay was apparent until the roots had gone into the cellar, where it developed quickly and became quite general in the stored crop.

Sections of roots were examined, but no primary organism could be found. Mould and other superficial growths could be found in great quantities, but these were believed to be

secondary and were developing on the liquid secretions of the decomposing roots.

A report of similar trouble in the parsnips in England is recorded in the Journal of the Board of Agriculture, April 1918. This article, which is an extract from the Kew Bulletin, states that this trouble is quite prevalent throughout districts in England where parsnips are grown, and is commonly called “Canker” or “Rust.” The injury is most apparent on the shoulder or the upper parts of the roots, and develops most rapidly on the interior tissues exposed by wound of the outer surface. This rupturing of the outer tissue is often caused by too rapid growth of the internal tissues. The canker develops as a form of false tissue on the unprotected internal tissues of these cracks.

Some experiments were carried out to find out if the disease could be transferred from infected to uninfected fields by means of a transference of infected soil, or by the distribution of portions of affected roots over the surface. The results demon-

may be applied at the rate of two hundred pounds per acre.

3. A dressing of coarse salt was found effective by some growers. The application of salt tended to liberate potash in the soil, which stimulated the growth of tissues which were more resistant to the disease.

4. Rotation of crops, or not growing two successive crops on the same land, would



PARSNIPS AFFECTED WITH PARSNIP CANCER. THE DISEASE IS SHOWN IN DARK AREA

strated that the disease was apparently not distributed in this way.

In the matter of control, a number of cultural remedies were suggested which might apply to advantage under Manitoba conditions,—

1. Avoid sowing parsnips on too rich a soil. Too rapid growth tends to develop cracking.

2. Apply lime to the soil, which has a beneficial effect in developing better quality in parsnips and in retarding decay. Lime

retard to a certain extent the development of the disease.

The disease itself is evidently largely induced by unfavorable growth conditions in the parsnip which cause rupturing of the external tissues. The method of control are to so regulate the soil conditions as to prevent a very rapid and unfavorable growth.

(The accompanying cut shows roots in various stages of decay caused by the parsnip canker. The darkened portions are the canker. The greyish portions are moulds or other secondary organisms.)

SASKATCHEWAN

CO OPERATIVE WOOL MARKETING

LAST year 916 consignments of wool, aggregating 394,000 pounds, were marketed through the Co-operative Branch of the Saskatchewan Department of Agriculture. Fifteen thousand sheep owners in the province have been notified that this system of marketing will be followed with the present season's clip and marketed through

the Canadian Co-operative Wool Growers' Ltd., at Toronto. Following are the conditions under which the wool will be marketed:—

1. The producer must agree to prepare and forward his wool in accordance with directions to be issued by the Branch.

2. The department will supply at cost, paper twine for tying fleece, and suitable sacks for shipping.

3. All of the wool must be shipped to Regina between June 1 and July 31. When received it will be weighed and graded in Regina by an expert grader provided free of charge by the Dominion Live Stock Branch. Contributors are invited to come in and see the grading work.

4. An advance payment will be forwarded as soon as the wool is received and when it is sold, a final payment will be made which will return to the producer everything realized from the sale of his wool, less the actual cost of twine, sacks, freight, storage and handling expenses.

CO-OPERATIVE HORSE SALES

BY W. W. THOMSON, DIRECTOR, CO-OPERATIVE ORGANIZATIONS

DURING the early years of settlement in Saskatchewan when large acreages were annually being brought under cultivation, large numbers of horses were brought in each year from Eastern Canada and the United States. This movement grew steadily during the years of rapid extension notwithstanding the fact that large numbers of horses were being bred and raised in the province, but since the outbreak of war in 1914 the amount of new land brought under cultivation decreased to such an extent that the demand for work horses has fallen off. The light tractor has to some extent replaced the work horse on many farms and the breeding of horses has increased until today Saskatchewan has in many districts a considerable surplus of horses.

Statistics show that in 1918 over 3,200 stallions were enrolled in the province and the 1919 colt crop is estimated at well over 15,000 head. Figures obtained by the department from reliable sources show that at present there is a surplus of around 20,000 head of farm horses, but notwithstanding this considerable numbers of horses are being imported both from the east and the west.

In view of this situation an attempt has just been made by the provincial Department of Agriculture to find a satisfactory home market for this surplus. Agricultural societies in the older settled parts of the province where the surplus principally exists, were circularized as to the advisability of holding co-operative horse sales, and eight sales were arranged. The object of these sales was twofold---

first, to serve as a common meeting ground where farmers of a district with horses for sale could meet their neighbours who wished to buy, and second--to enable horse dealers to conveniently inspect and purchase horses in large numbers for shipment to districts where a shortage still exists.

In Saskatchewan, as elsewhere, farmers appear somewhat slow to deal with their neighbours and many seem to prefer purchasing imported animals from a dealer rather than to buy from their neighbours, animals that they know have been raised in the community and are suitable to their requirements. It was felt that these sales would largely overcome this difficulty and that they would also afford opportunities for horse dealers to secure the animals they required without going outside the province. It is generally recognized that home grown stock that is accustomed to the feed and climatic conditions of the West is superior to imported stock and that the horse sales should therefore be a benefit to the horse breeder, the horse dealer, and the farmer who requires to purchase.

Each society that undertook to hold a horse sale made its own regulations and local arrangements for its sale. In the majority of cases a local auctioneer was employed and all animals offered for sale were listed with the secretary and settlements were made through the agricultural society. In two cases sales were by private treaty, no auctioneer being employed, the farmers simply bringing in their stock on the date set and selling by private sale to any buyers in attendance.

The department undertook to advertise the sales in all parts of the province and to make every effort to secure the attendance of buyers from outside points. As this was the first occasion on which sales of this kind were attempted it could hardly be expected that they would be in every case an unqualified success, but many valuable lessons were learned, which will be of service in planning future sales.

From 30 to 60 horses were entered at each sale, but unfortunately a considerable percentage of these were well advanced in years or were otherwise unsuited for the best trade. Evidently some contributors looked upon these sales as an excellent opportunity to dispose of animals for which they had no further use. When good animals were put in they were in most cases held at high reserve prices.

The sales were held rather late in the season and consequently

dealers had hardly sufficient time to purchase animals at the sales and resell them before the commencement of seeding. Representatives from the Soldier Settlement Board attended several of the sales and purchased two car loads of horses at prices which were considered quite satisfactory by the owners. Many private individuals, mostly from the district in which the sale was held, purchased horses for which they would otherwise have had to patronize a dealer. In most cases the officials of the agricultural societies concerned expressed themselves as being anxious to again hold sales next year and officials of the department are fully convinced that sales of this kind will play an important part in developing the horse breeding industry of Saskatchewan. Plans are already under way to hold a much larger series early in 1920.

ALBERTA

THE EXPANSION OF AGRICULTURAL TEACHING SERVICES

BY JAS. MCCAIG, M.A., EDITOR OF AGRICULTURAL PUBLICATIONS

THE Minister of Agriculture for Alberta, Honourable Duncan Marshall, made two important announcements relating to the provincial Agricultural Schools, in his review of conditions and statement of policy before the legislature recently.

THREE NEW SCHOOLS

The most important announcement relates to the increase in the number of schools. There are now three of these in operation at Olds, Claresholm and Vermilion. They may be considered to have more than justified their establishment. In the last four years they have taken care of fourteen or fifteen hundred boys and girls and have been received warmly into the institutional life of the country. They have the aspect of a local

service on account of their number and also on account of their being established not in city environment but in country or country towns. They look nearer home than the college and they do not impose academic restrictions on farm boys. Three new schools will be built this season and will be ready for occupation by November 1. They are to be established at Raymond, Gleichen and Youngstown. The Raymond school will be on an irrigated farm and will relate itself to this type of farm enterprise. The Canadian Pacific Railway Natural Resources Branch is helping the Gleichen enterprise along by a gift of a half section of land. The school at Youngstown will serve an area so far not provided with such school services.

AMALGAMATION OF SCHOOLS AND FARMS

The schools at present in operation are situated on demonstration farms. These farms have proved of great assistance to the schools in the furnishing of live stock for demonstration and judging and have likewise stood out as examples of well managed and equipped farms that are good object lessons within the observation of pupils. It is the aim of the minister, however, to more closely co-ordinate the work of the schools and the farms, and the Demonstration Farm Branch as a separate administrative branch, will be done away with and the farms will be made accessory to the schools. Their management will be in the hands of selected members of the staff, preferably the animal husbandry instructors, so that herd development, breeding, and care will be an expression of the teaching in the schools. Mr. Marshall aims to conserve the prominence which the province has already reached in live stock, as the best thing that can be done to stabilize and build up farm industry.

Under the new arrangement the instructors in the agricultural schools will act as agricultural agents in the province. A number of changes in the staffs of these schools have recently been made. Following the resignation of Mr. W. J. Elliott, principal of the Olds School of Agriculture, Mr. F. S. Grisdale, B.S.A., formerly principal of the School of Agriculture at Vermilion has been appointed to succeed Mr. Elliott. Mr. Grisdale's place at Vermilion has been taken by Mr. J. G. Taggart, B.S.A., a Nova Scotian, born in Cumberland county. Mr. Taggart secured his B.S.A. degree at the Ontario Agricultural College in 1911 after spending two years at Guelph, following two years at the Nova Scotia Agricultural College. Before going west he served three years in district representative

work in the counties of Victoria and Frontenac, Ontario. For two years he was instructor in animal husbandry at Vermilion and for three years science instructor at the Olds School.

Mr. J. C. Hooper, M.A., has been appointed provincial agricultural biologist and is stationed at Claresholm. Mr. Hooper lived on a farm in Prince Edward county for some years before attending Queen's University. While at Queen's Mr. Hooper took a scholarship in organic chemistry; was gold medallist in biology in his final year; took first-class honours in all subjects and obtained his M.A. science specialist degree at the end of his fourth year.

He has had four years' experience in the Biology Department of Manitoba Agricultural College; five years' experience as science teacher in the School of Agriculture at Claresholm; three summers' experience in teaching agricultural biology at the summer school for teachers at the University of Alberta.

Mr. E. S. Hopkins, B.S.A.; M.Sc., has been put in charge of provincial soil investigations and is stationed at Olds. Mr. Hopkins was brought up on a farm near Lindsay, Ont.; worked on the field service of the Department of Physics of the Ontario Agricultural College making farm drainage surveys for farmers throughout Ontario; district representative of the Ontario Department of Agriculture in Peterboro county for two years; instructor in science for five years at the Vermilion School of Agriculture.

Mr. Hopkins attended the public and high schools in Lindsay, and graduated from the Ontario Agricultural College in 1911. He secured the degree of master of science at the University of Wisconsin in 1916, specializing in soils and crops, and is at present a graduate student in Cornell University, Ithaca, N.Y., specializing in soils, crops, and chemistry.

BRITISH COLUMBIA

DISEASE RESISTANT VARIETIES OF POTATOES

BY P. A. BOVING, ASSOCIATE PROFESSOR OF AGRONOMY

BREEDING work with potatoes was begun at the University of British Columbia only three years ago, consequently our results so far do not permit the drawing of any definite conclusions.

This much, however, may be said, that we have selected a number of hills from upwards of forty different varieties which were more or less affected by different diseases. In many cases, but by no means in all, these hills, which have undergone a severe scrutiny first at the time of digging, secondly in mid-winter and thirdly immediately before planting in the spring, have given us a promising parentage for new disease-free seed. One certain variety, "The Duchess of Connaught," showed about 80 per cent diseased plants in the original stock. Now we have selections from this variety which are practically free from any kind of disease.

We have not limited ourselves to hill selection from old varieties, but have also made a number of new seedling selections, which, generally speaking, are more disease resistant

than the parent varieties. These seedlings vary immensely in regard to different characters. For instance, seed from the "Irish Cobbler", which is an early-maturing, white, roundish-flattened potato, has given us long, oblong, oval, round and kidney-shaped potatoes, more or less flattened or round. This tendency to variation is not limited to shape only, and from the same variety we have obtained all colour shades from white to yellow, pink, rose, mottled, purple and blue. The Irish Cobbler has dark green stalks and rather short-jointed stems. The progeny shows all kinds of variations in stem growth from erect to almost flat. The original stock was not particularly noted for disease resistance, but these young seedling families seem distinctly more disease resistant than the parent varieties.

It is, as stated before, too early to say anything definite in regard to results, or even concerning possibilities, but we have great hopes for this province in connection with the work in potato breeding.

PROVINCIAL SEED FAIR

BY EVERETT HOGAN, SOIL AND CROP INSTRUCTOR

THE success of the annual British Columbia seed fair which was held at Kelowna was interfered with by postponement due to the influenza epidemic. Nevertheless it was the most successful seed fair yet held in the number of exhibitors as well as in the general quality of seed displayed.

There were forty-three classes in the prize list, with three prizes, ten, eight, and five dollars, in each class. Somewhat over two hundred entries were in competition, and the total prize money paid was six hundred and eighteen dollars.

The classes which called out the largest number of entries were hard spring wheat, late potatoes, corn, both flint and dent, beans and onion seed. The mangel seed class had seven entries of excellent quality.

With root and vegetable seeds,

many would-be exhibitors were prevented from entering by reason of not having equipment to clean their seed properly. This industry is in its infancy here, but it is hoped many of the difficulties such as the above, will soon be overcome.

The annual meeting of the British Columbia Seed Growers' Association was held on the second day of the Fair. It was decided at this meeting to form branch associations in the various seed growing centres, the chairman of each local to be a director in the main association. In this way the work of each district can be advanced more readily. Plans for a seed marketing branch were discussed and a committee appointed to make investigations and recommendations along this line.

The Provincial Seed Fair for 1919 will be held in Kamloops.

PART III

Junior Agriculture

DEMONSTRATIONS, COMPETITIONS, AND CLASS-ROOM STUDIES IN RURAL
LIFE FOR BOYS AND GIRLS

THE PLANTING OF SCHOOL GROUNDS QUEBEC

MACDONALD COLLEGE

BY T. G. BUNTING, B.S.A., PROFESSOR OF HORTICULTURE

THE school grounds of many of the rural schools of the Province of Quebec as well as in the other provinces are anything but attractive. They have been considered simply from the standpoint of a yard or playground and have been kept free of flowers, shrubs and trees, with few exceptions, and the buildings themselves are often plain and unattractive. Here and there through the country are school grounds that have been attractively planted with native trees and shrubs taken from the woods or with plants purchased from a nurseryman. The school teacher and pupils as well as the parents can and do take a greater pride in the country school where it is attractively laid out with trees, shrubs, vines and flowers, without these interfering with the space set aside as a playground. That school children will respect and help care for these plants has been demonstrated many times where these plantings have been made.

The Horticultural Department of Macdonald College has undertaken some work in this respect and has been growing trees, shrubs, vines and perennial flowers with a view to planting representative school grounds in various parts of the province. An offer is made to the school commissioners to provide them with a quan-

tity of plants for this purpose free of cost. The commissioners are asked to forward a sketch of the school grounds, buildings, trees or any landmarks on the property and from this sketch a planting plan will be drawn to scale suggesting the position that the different plants should be placed in. The school commission is also asked to pay express charges on the shipment and to take care of the planting according to the plan and directions forwarded with the shipment. Visits will be made from time to time to these school grounds and instructions given as to the future care of the plants and assistance will also be given in pruning them and where necessary plants will be replaced.

Already a number of school grounds have been planted under this arrangement. In 1918 schools at the following places received assistance in this way—Luskville School No. 3, Parkers Station No. 4, Sweetsburg, St. Andrews East, Aylmer East No. 1, Aylmer East No. 2, Lachute R.R. No. 4, Hatley and Bulwer, and in all cases, except one where the plants were delayed in express, they did well.

In each case about 60 shrubs, 10 trees and 10 vines were provided. The varieties have been selected with a view to their hardiness,

ornamental value, and suitability to the general conditions under which they will be grown. Varieties that are susceptible to disease, or insect attacks or are poor growers have been eliminated.

Among them, apple and plum trees of good varieties have been furnished as well as grape vines for fences. The object of thus providing fruit trees and vines is that in addition to being valuable as an ornament and for shade they will also provide fruit for the children on their return to school in September;—an apple or plum tree is a beautiful ornamental tree, not only when in bloom but also in fruit and its form and foliage is most attractive.

In preparing the plans for planting, the shrubs have been arranged in clumps about the school building and with a view to screening any outbuildings. The trees and remaining shrubs have been placed at the boundaries of the school grounds leaving the centre and main part of the grounds open for a playground. The vines have been placed to suitably cover any unsightly parts of the buildings or fences. A stone,

brick, or frame building is often made more attractive by planting vines of the self-fastening Virginia Creeper to cover or nearly cover it. The grape vines have been largely for the fences.

This work will be continued in future and it is hoped that as the trees and shrubs and other plants obtain their growth the interest in planting about school grounds as well as the farm home can be greatly increased. An attractive farm home surroundings will do much in keeping the boys and girls as well as the older people contented on the farm. The farmers from their knowledge of plant life and growth should be the leaders in this work. In the past he has considered himself too busy to give the question of beautifying his home or rural school any attention.

The Department of Horticulture at Macdonald College are prepared to assist a number of schools in this work this spring and would be pleased to have any school commissioners in the province interested communicate with the College with a view to securing this aid.

ONTARIO

BY A. H. TOMLINSON, B.S.A., LECTURER IN LANDSCAPE GARDENING

THE Ontario Agricultural College, through the Division of Landscape Gardening of the Department of Horticulture, is giving special attention to the beautifying of rural home and school grounds.

Any rural resident or organization may write and procure advice free in connection with the location of buildings, as farm or school, the planting of rural home and school grounds, churchyards, cemeteries, village parks, greens or playgrounds.

When plans are necessary for the laying out of grounds, those seeking help may send, to the Department, rough sketches of such. The following questions are usually submitted to the enquirer to aid in procuring information in a letter or sketch.

Dimensions of grounds to be laid out.

Dimensions and location of buildings and fences.

Suggest site for new buildings.

Show planting, lawns, and playing courts, if such exist.

Indicate slope of land.

Mention class of surface and sub-soils.

Show points of compass.

If a school grounds is to be decorated, then in addition to the foregoing;

Suggest a site for a garden if such is required.

Locate playground.

Give number and name of school, name of township and county.

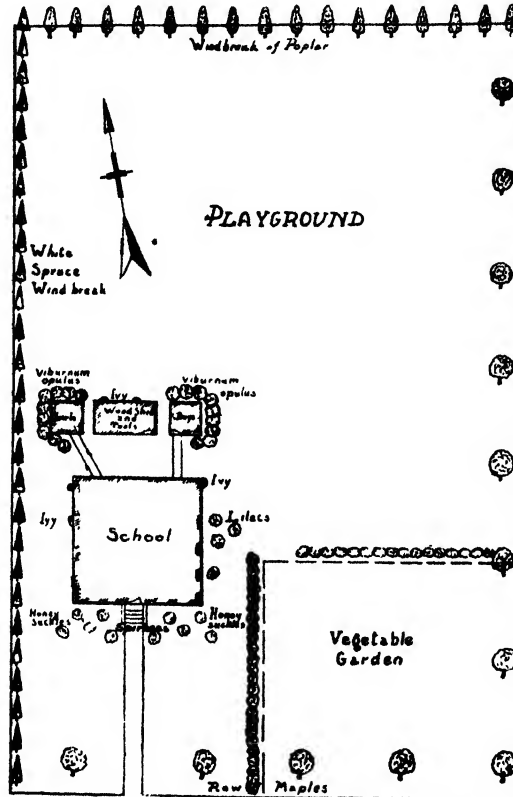
Give name of applicant and full address also official position.

Blue prints easy to follow are forwarded free to those furnishing the necessary information. These outline a system of planting and give a list and number required of suitable trees, bushes, climbers and perennials.

The common and scientific names of those are given to avoid confusion of varieties.

lists of planting material recommended.

Nursery stock required may be purchased co-operatively where several need such or it may be bought direct from the nurserymen or through a horticultural society or rural organization. The delivery and distribution of the stock is left in



PLAN FOR HALF-ACRE SCHOOL GROUND

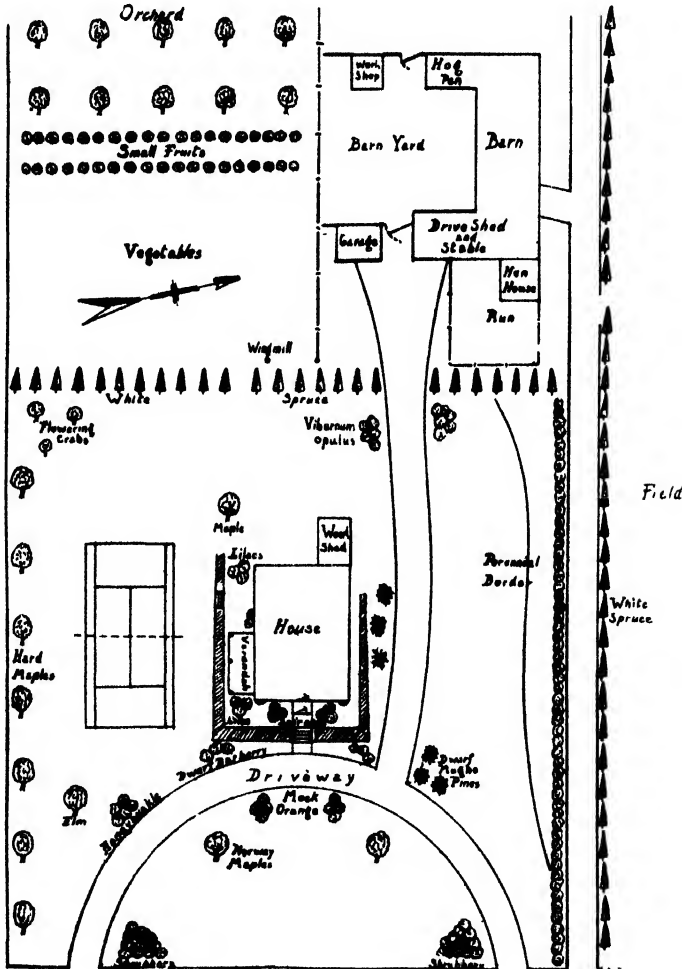
Rural committees through the agricultural representatives, school trustees, inspectors, and teachers, or the leaders of rural societies may arrange with the department free of cost for a visit of the landscape gardener for the purpose of having illustrated addresses, advice right in the district, surveys and rough sketches made on the grounds. Blue prints are forwarded free, later, showing location of buildings, planting schemes and

the hands of a responsible person who is paid for services rendered. For school or on public grounds gifts of planting are always acceptable. Where possible some of the stock may be got from the woods.

The planting of school grounds usually takes place on Arbor day and Saturdays. The teacher, trustees, parents, friends and children, all who can, are expected to help in the work. A superintendent is needed. This

usually is the teacher's lot on account of the teacher's interest in the movement and often previous training at a summer school. The planting of a rural home ground may have to be done by one person but co-operation is urged. For the planting of public

The names and addresses of applicants for blue prints are kept on record, that the department may find out what progress is being made with the movement. Original plans are filed for reference in case changes have to be made in a planting scheme



PLAN FOR RURAL HOMESTEAD

places community interest and help is essential and horticultural societies now organizing will no doubt aid in this. Few rural planting schemes are likely to be finished in one season. The work often spreads over a period.

and further blue prints are required.

In fostering rural beautification in the province advice and help may be had free from the Agricultural College, Guelph, by writing either the President, Professor of Horticulture, or myself.

MANITOBA

BY R. FLETCHER, B.A., DEPUTY MINISTER OF EDUCATION

WE have no general policy in the matter of laying out and planting school grounds. We have been urging upon the trustees in every way possible that they secure ample sites and beautify them, and we supply free every year a certain amount of material from the nurseries in connection with our Normal School at Brandon. We stand ready to advise and assist any school board in planning its site and last year we had special landscape plans prepared for two of our newer

consolidated districts by Professor Stoughton of our University staff.

One school district has written to enquire if it will be permissible to establish a small park on the school site and to erect there a memorial to the boys who have fallen in the war. We have replied that the park ought to have been provided several years ago and that we are glad that at last the community is realizing its responsibility and its privilege in the matter.

SASKATCHEWAN

BY AUGUSTUS H. BALL, M.A., LL.B., DEPUTY MINISTER OF EDUCATION

IT has been the policy of the Department of Education for many years to encourage the planting of trees and shrubs on school grounds in Saskatchewan. In 1915, when two Directors of School Agriculture were appointed, arrangements were made with the Superintendent of the Forest Nursery Station, Indian Head, whereby any school district, whose grounds were reported by the directors as having been satisfactorily cultivated, would receive a large number of young trees of varieties suitable for shelter belts or ornamental planting. Since that time about 300 districts have been supplied with approximately 800 trees each, and in most cases the trees are well looked after and consequently a considerable improvement in the appearance of the school grounds has been effected.

To successfully develop a good shelter belt on the prairies of this province is not an easy matter and thorough preparation of the ground is absolutely essential. Very careful summer-fallowing is necessary and no trees are sent out until the Superintendent of the Forestry Station is assured that such preparation of the soil has been given.

School districts making application for trees to the department are asked to furnish on the application form definite particulars with regard to the size of the grounds, the character of the soil and the cultivation it has received. This form must be received at the department before May 1st and during the following summer the grounds are inspected and a plan of the proposed planting obtained. The trustees are then asked to sign an agreement to properly plant and care for the trees supplied.

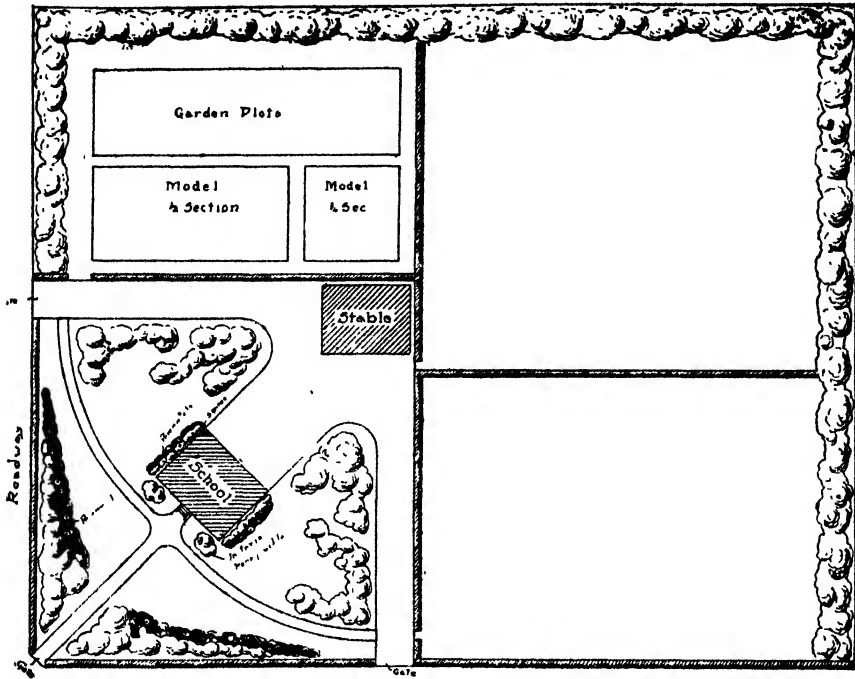
Such information as is required by the Superintendent of the Forestry Station is forwarded to him by the department, and to districts which have properly prepared the ground for planting he sends a suitable number of young trees of tested varieties.

To assist trustees and teachers in the work a bulletin entitled the School Garden and the School Grounds has been prepared and distributed by the department. This publication gives definite instructions for the cultivation of the ground, the selection of trees and shrubs, the planting and care of shelter belts,

plans for ornamental planting, etc. In a few cases the department has prepared special plans of school grounds for trustees who have asked

meetings of trustees and teachers throughout the province.

Shrubs and perennials for ornamental planting are supplied each



TREATMENT FOR SCHOOL GROUNDS AT SOUTH-WEST CORNER

for this assistance while numerous illustrated lectures on the subject of tree planting have been given to

year to a limited number of districts by the provincial nurseries of the Department of Public Works.

BRITISH COLUMBIA

BY J. W. GIBSON, M.A., DIRECTOR, ELEMENTARY AGRICULTURAL EDUCATION.

BECAUSE of the fact that the majority of the schools of the province are quite below the standard of excellence of the school buildings, and in order to encourage trustee boards to improve the school grounds of the province, the department has decided to make certain special grants which will be conditional upon the expenditure of equal amounts by each school board concerned. The grants referred to are not for such essential preliminary work as logging, stumping, rough-grading, and fencing,

but for such subsequent improvements as draining and fine-grading preparatory to seeding and planting the grounds. Besides helping to defray the expenses connected with materials and labour required in the draining and fine-grading of the grounds, this grant may be used in purchasing lawn-grass seed, flower seeds and plants, ornamental shrubs, vines, and trees; for top-dressing and fertilizing lawns, flower borders or shrubbery, and for irrigation where such is necessary. In all cases the teachers and pupils are expected to

co-operate with the school boards in connection with the planting and care of the grounds.

The maximum grant given by the department will be dependent upon the size of the grounds and the number of rooms in the school usually occupied. The schools will be classified as follows:—(1) One or two rooms; (2) three or four rooms; (3) five or six rooms; (4) seven or eight rooms; (5) more than eight rooms; and the minimum area on which grants will be given is as follows:—(1) One or two rooms, 1 acre; (2) three or four rooms, $1\frac{1}{2}$ acres; (3) five or six rooms, 2 acres; (4) seven or eight rooms, $2\frac{1}{2}$ acres; (5) more than eight rooms, 3 acres. The maximum grants to be given by the department on this condition and classification are as follows:—

- (1) One- or two-room school, minimum area of grounds 1 ac., \$125.
- (2) Three- or four-room school, minimum area of grounds, $1\frac{1}{2}$ ac., \$175.
- (3) Five- or six-room school, minimum area of grounds, 2 ac., \$225.
- (4) Seven- or eight-room school, minimum area of grounds, $2\frac{1}{2}$ ac., \$275.
- (5) More than eight-room school, minimum area of grounds, 3 ac., \$350.

In the case of city schools, where the area of the grounds falls below the minimum stated above, and where an enlargement of the grounds would entail a very large expenditure by the school board, the department may, on the advice of the local school inspector and the director, contribute the amount allotted to the improvement of grounds of the same area as recorded in the above table of grants.

School boards wishing to avail themselves of this offer must notify the Director of Elementary Agricultural Education, and in doing so must enclose a plan of the school grounds drawn to a scale, giving dimensions of grounds, location and dimensions of buildings, walks,

streets, etc. The improvements to be defined in connection with these plans must have the approval of the department, and must be carried out within a period of two years from the time that said scheme of improvement receives the approval of the Department.

ANNUAL GRANTS TOWARDS MAINTENANCE OF SCHOOL GROUNDS

In order to assist school boards in keeping the school grounds neat and attractive from year to year, the department will make annually certain maintenance grants based upon the reports of local school Inspectors. A scheme of classification similar to that already outlined for school gardens will be followed here. These annual grants for maintenance will not be paid to school boards engaged in an initial scheme of school-ground improvement until the year following the completion of that scheme for which grants have already been provided.

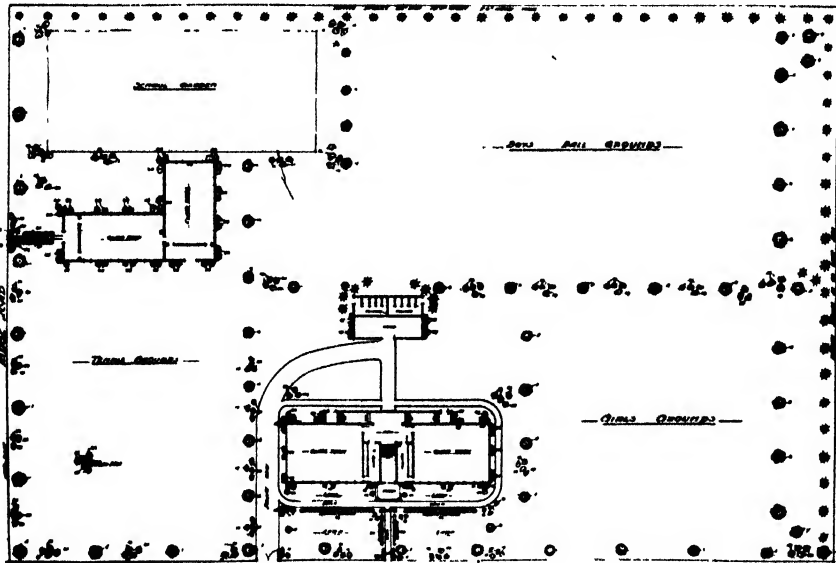
The annual grants for maintenance are as follows:—

	Grade A	Grade B	Grade C
One-room school. ..	\$ 15	\$ 10	\$ 5
Two-room school...	24	16	8
Three- or four-room school . . .	33	22	11
Five- or six-room school	42	28	14
Seven- or eight-room school	51	34	17

School boards undertaking the improvement of their school grounds with the advice and approval of the department are eligible to receive additional assistance in the form of ornamental trees and shrubs from the provincial school nursery. Transportation charges on such nursery stock must in all cases be met by the school board. It is recommended that each board appoint a school grounds committee to consist

of one or more members of the board, together with the principal of the school, and such other person or persons as might render special assistance along this line. It would be the duty of this committee to discuss with the Director of Elementary Agricultural Education all matters pertaining to planning and improving the grounds, and to report to the school board.

High-school grounds have the same status as public-school grounds in connection with grounds improvement work. When a high school is located in the same ground with a public school, one grounds improvement grant only is given, the amount of the same being based upon the total number of rooms in both schools.



SCHOOL GROUNDS AT MAPLE RIDGE, BRITISH COLUMBIA

PLANTING MATERIAL

The planting in the above plan included the following materials:

- | | |
|---|---|
| Acet. Macrophyllum (Broad leaf maple) | Corylus Atropurpurea (Hazel) |
| " Pseudo Platanus (Sycamore Maple) | " Aurea (Hazel) |
| " Negundo Arg. Var. (Silver-leaved maple) | Amorpha Crispa (Lead Plant) |
| " Purpurea Spatula (Purple-leaved maple) | Amgdalis Siberica (Siberian Crab) |
| " Colchicum Rubrum | Malus Varieties Assorted (Flowering Crab) |
| " Pseudo Platanus Leopoldi | Ligustrum Aureum (Golden Privet) |
| " Platanoides Schweileri | Sambucus Assorted Var. (Elder) |
| " Japonicum Polymorphum | Spiraea Opulifolia Aurea |
| " Circinatum (White maple native) | " Reevesiana |
| Spiraea Van Houttei | Cupressus Lawsoniana (Cypress) |
| Cydonia Var. | Retinospora Plumosa Aurea |
| Weigela Var. | Berberis Thunbergii (Japanese Barberry) |
| Hydrangea Paniculata | " Vulgaris (Common Barberry) |
| Cornus Var. (Dogwood-Assorted) | Roses Var. |
| Corylus Avelana (Hazel) | Herbaceous Perennials |

MANUAL TRAINING IN PUBLIC SCHOOLS

NOVA SCOTIA

BY J. E. BATTEAUX, M.A., INSPECTOR OF EVENING TECHNICAL SCHOOLS AND DIRECTOR OF MANUAL TRAINING SCHOOLS

MANUAL training (mechanic science branch) has had a place on the curriculum of the public schools of the province for the past twenty years. At the present time the subject is taught in seventeen centres. The Government gives a generous grant toward the support of these departments, going to the extent, in some cases, of paying one-half the entire cost.

Teachers receive the necessary special training at the centre at Truro which is in affiliation with the Provincial Normal College. The time required to complete the course varies somewhat with the applicant's previous training, but is usually about one year. On the completion of the course a Manual Training (Mechanic Science) License is issued to the candidate.

Each manual training centre is to furnish, as a minimum, accommodation for twelve pupils to work at one time. Each pupil must be provided with an individual work-bench and the following wood working tools: plane, saw, set of chisels, marking gauge, square, rule, hammer, mallet, etc. In addition to these individual equipments, large cross-cut and ripping saws, jointers and other special planes and tools are provided for general use. Several of the larger centres are furnished with turning-lathes and combination wood working machinery.

The course teaches the use of tools in making simple articles for the home

and pupils' use, such as coat-hangers, towel-rollers, barrel-covers, cutting-boards, sleds, key racks, etc., during the first part of the course. In centres where the work is carried on in the high school grades, ambitious projects in cabinetwork and furniture-making are carried out. Each year sees music cabinets, medicine cabinets, easy chairs, grandfather clocks, etc., turned out that in finish and workmanship will compare favourably with similar work from professional sources. A working drawing is required to accompany each piece of work. The raw material for all this is provided by the several school boards. The finished product is the property of the pupil.

The subject is on an equal footing with other subjects of the school curriculum, but is not compulsory. When elected a pupil spends about two and one-half hours of each week in this department. First year high school pupils may offer manual training in place of a science subject at the provincial examinations. This is a recent regulation, and is having the effect of greatly stimulating the work in the high school grades.

The articles made are generally those common to all dwelling houses, which are of simple construction and adapted to the graduated progress of beginners. As these schools are only in towns and villages, the making of distinctively agricultural implements and apparatus is not exclusively encouraged up to the present.

NEW BRUNSWICK

BY F. PEACOCK, DIRECTOR, MANUAL TRAINING AND HOUSEHOLD SCIENCE

THE Department of Education in New Brunswick encourages manual training in the public schools by paying a special grant of

two hundred dollars (\$200) towards the salary of any full time teacher engaged to teach the subject. In rural communities where the full time

of the teacher would not be required for the subject, the government offers a bonus of fifty dollars (\$50) a year to any teacher devoting three hours a week to it. In addition, the government pays one-half the cost of manual training equipment in all schools of the province.

At the Provincial Normal School, all male student teachers, are given two afternoons per week, and all female students one, in the subject of manual training. This, in addition to summer courses in the subject, prepares any teacher to take up the work in rural communities. A special department of the Normal School gives an extended course in the methods and practice of manual training to prepare teachers for the larger schools of the province, in which they devote their full time to the subject. Only teachers of successful experience are admitted to the latter course.

Hitherto manual training has been confined to wood-working and is organized formally for Grades 6, 7, and 8. In addition, many schools take hand-work in the first five grades, using such material as paper, cardboard, raffia, reed, thin wood, binding-cloth, etc. The equipment required for the formal work is a wood-working bench and small kit of tools for each student, together with certain more expensive tools and appliances which are used in common by the class. This means of course that a

separate room must be provided for manual training. In some cases, however, in small rural schools benches are placed in one end of the regular class room.

The raw materials used by the students in manual training work are in general provided by the school boards. In some cases, however, where large boys undertake more ambitious projects, they are asked to pay for the materials used in whole or in part. The manual training departments of rural communities have lately taken up the matter of agricultural projects that the boys could use in connection with their farm work. These include such things as ladders, gates, bird-houses, self-feeders, and even movable hog, and hen houses. For these of course, the material would always be provided by the boy.

No manual training department is recognized unless the students spend at least two hours per week at the subject. This means that in the curriculum of Grades 6, 7, and 8, it occupies approximately one-twelfth of the time.

The subject has never been compulsory in New Brunswick, but the school boards of practically all of the provincial centres of population have made provision for it, and where the boys have the privilege of taking manual training they never fail to utilize the opportunity.

ONTARIO

BY ALBERT H. LEAKE, INSPECTOR OF MANUAL TRAINING AND HOUSEHOLD SCIENCE

AGRICULTURAL education has made great strides in this province during the past five years, and there is now a general consensus of opinion that the agriculture of the future will depend to a large extent on the character of the education given in our schools.

With the increase in the number of schools introducing this subject there has come a wider conception and it now includes practically all that pertains to production on the farm, the

comfort of the farm home and the general conditions of life in the rural districts.

The condition of the material equipment on the farm is scarcely less important than the methods of production employed in the raising of crops.

In accordance with this point of view, attention is now being paid in all the agricultural courses to manual training and farm mechanics with the object of instruction that will enable

the boys to make many things needed and to execute many minor repairs in order to avoid waste and increase efficiency.

In every rural school we are endeavouring to install at least one bench and a set of tools. This work should keep in view the tools the boy will probably have at home and may well be directed to the making of articles which can be put to some immediate use at home or in the school. If in the school there are a number of large boys, the carpentry may well expand within a year or two so as to undertake the enterprise of building a small shop on the school grounds and fitting it up for working purposes. In several schools a light basement has been adapted to this purpose, and in others a bench has been built in one corner of the classroom.

With the right kind of a teacher, exercises may be given in the sewing of leather and in the splicing of ropes and knotting, finding practical application in the mending of harness, making of halters, etc., as the necessities of the farm may require. Some practical lessons in painting and glazing may be given, and opportunities are not lacking for applying the knowledge and skill thus gained to the school or farm buildings. Tumbledown fences, broken window panes, sagging doors, broken locks or latches, ill-kept grounds, untidy paths, broken chairs and rickety tables will not be found where all have pride in their school and the boys have been taught how to make things and do simple repairs. Many country schools in the province are paying attention to these things, and now that fairly liberal grants are being given to trustees and teachers the outlook for the future is bright.

FARM MECHANICS AT HIGH SCHOOLS

A recent departure has been the establishment of farm mechanics departments in connection with the agricultural departments of the high and continuation schools. So far,

three of these have been formed—Whitby, Oakville and Port Perry. The idea at the back of these departments is that the progress of agriculture and the success of farming operations depends very largely upon the condition of the material equipment of the farm. The work suggested for these departments is as follows:—

(c) To make articles required on the farm or in the home, e.g., wood-box, book-shelf, milk-stool, saw-horse, poultry feed boxes, butter-worker.

(2) To put down cement sidewalks about the home; making cement fence posts, water troughs, etc.

(3) To use the farmer's hand forge and to learn to make simple repairs.

(4) To build, repair, and readjust farm gates.

(5) To repair barns and sheds, replacing broken windows, floors, partitions, steps, etc.

(6) To plan, make out bill for material, purchase, and build new poultry house, pig pen or shed.

(7) To build in new ventilators in stables.

GRANTS PROVIDED

Liberal grants are provided by the department and the work is meeting with much success. The aim is to carry on only such work as has a definite relation to that required on the farm. Mr. W. J. Black, when Commissioner of Agriculture, inspected the work of these schools and expressed the opinion that the work being done was just the kind required.

The method of procedure at Port Perry is interesting and instructive. The only accommodation available was an old wood-shed, and it was decided to adapt this for the purpose. For several weeks the boys were divided into two classes of four each and they worked with the expert carpenters and cement men, and under their direction did a large portion of the work on what is to be the farm mechanics building. They jacked up the woodshed, cleaned it out, prepared the foundation and the whole floor space, and put in a cement foundation and floor.

The boys repaired and adjusted several pieces of furniture about the school, repaired a cupboard for the

household science department and the tables and chairs in the agricultural class-room. Home projects received considerable attention, and among these, after due care and deliberation, some of the boys have decided to construct small outbuildings at home, one a woodshed, one a chicken house, and one a pig pen. Another boy is preparing to lay a cement floor in one of his home farm buildings.

At Whitby, the farm mechanics shop is fitted with benches, tools, and forges. This room has proved too small for the work intended, and the boys are engaged in fitting up another shop. They have lined a part of the old gymnasium with building paper and are covering the walls with matched lumber. In this connection they will have to put in at least three doors and do the finishing around six windows. In addition to this each boy is planning to make a carpenter's bench for himself to take home at the end of the term. Other articles they

made or have in the process of making at the present time are: fruit-picking ladder, saw-horse, trap nests, chicken-fattening crates, nail boxes, etc.

The class in Oakville has also done good practical work. They have built the work benches they use and have made various articles such as a cement scraper, cement trowel, chicken feeder, fattening crate, model of farm gate, saw-horse, etc. In each case they made a working drawing and freehand sketch and prepared a bill of the material required.

Work of the character being done in these schools has a direct bearing upon the agricultural processes of the farm, and is viewed with great favour wherever it has been introduced.

The grants given by the Department include fifty per cent of the value of the equipment for the first year and twenty-five per cent of the value of said equipment for each of the two years thereafter—maximum total grant of equipment. Other grants are also given.

MANITOBA

BY S. T. NEWTON, DIRECTOR, EXTENSION SERVICE

DURING July each year the Extension Department has co-operated with the Department of Education in holding from eight to twelve short courses in connection with the Manitoba Boys' and Girls' Clubs.

During this month it is possible to secure the services of expert instructors in wood and metal working from the Winnipeg, Brandon and Killarney Schools.

The usual plan followed has been for the officers of the Boys' and Girls' Club to discuss with the school trustees the advisability of holding such a course, and if there is an advance enrolment of twenty-five, a course is arranged.

The Extension Service provides the teacher, and takes care of his salary, travelling and living expenses.

The trustees usually permit the use

of one of the rooms in the school, or permission to use the Agricultural Society hall is obtained. They generally supply the material used, except for a few very pretentious projects like hog self-feeders, chicken brooders, etc., the material for which is provided by the boys themselves.

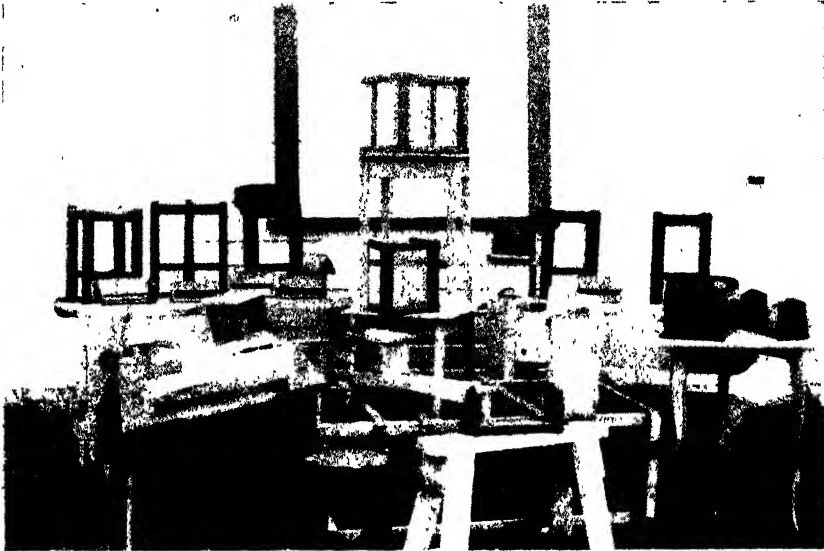
The boys,—and sometimes girls, gather up such tools as they happen to have around the home farm. The teacher brings a few with him, and in some cases the school board has a couple of benches and some tools.

The first day is usually spent in constructing benches such as a carpenter or builder would make for a small job, and by noon of the second day everyone is busy on his own particular problem. If a boy has chickens, he makes a coop in which to exhibit them at the fair, or a self feeder and so on with the other

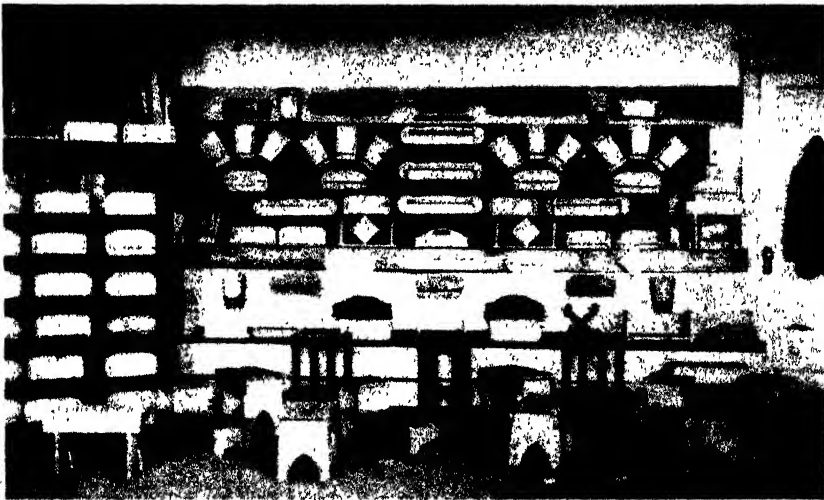
problems. The article made fills a real want, and, notwithstanding the fact that the boys have had very little previous training in the use of tools, a very large percentage of the

It also meant that he took a deeper interest in other phases of club work.

The course continued for a period of two weeks, and it was not unusual for the instructors to find the class



PRODUCTS OF MANUAL TRAINING SHORT COURSE



ARTICLES MADE BY SMALL BOYS AT MANUAL TRAINING SHORT COURSE

articles made would do credit to boys much older.

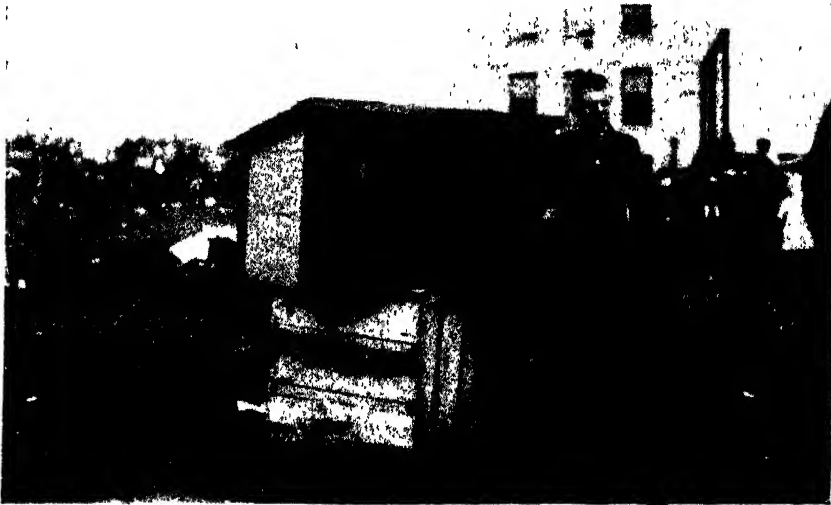
One of the chief purposes served is in enabling the boy to discover the fact that he has ability to do things that neither himself or his parents had thought possible.

assembled by eight o'clock, and it was difficult to get rid of them at six.

There was no difficulty in the boys losing interest, or losing a part of their project by reason of a week elapsing between each lesson as is generally the case where manual training is

taught. The boy kept right on the next morning where he left off the night before, full of enthusiasm, and the consequence was that there were

much as they would have their regular vacation recreation, for, after all, recreation has been aptly defined as "doing what one likes to do," and



POULTRY CRATE MADE BY MEMBER OF BOYS' AND GIRLS' CLUBS

many boys who did as much work in the two weeks as is accomplished in a whole year taking a half day a week.

The boys enjoyed the work as

the boys certainly liked to make card tables, chicken brooders, milking stools, screen windows, feed carts, camp chairs, foot stools, etc.

SASKATCHEWAN

BY AUGUSTUS H. BALL, M.A., LL.B., DEPUTY MINISTER OF EDUCATION

THE provisions of The School Act and of The Secondary Education Act in regard to manual training and industrial work in Saskatchewan are:

The School Act.

"183. The board of any district, subject to the regulations of the department in that behalf, shall have power;

1. To make such provisions as it deems advisable for giving instruction in its schools in manual training, industrial training, domestic science, and physical training.

2. To make such provision as it deems advisable for industrial evening schools in which persons employed during the day may receive theoretical and practical instruction in the trades or occupations with related instruction in English, mathematics, drawing, science, history, and geography.

3. To appoint an advisory committee of at least seven members, the persons so appointed to be resident ratepayers of the district and to be selected on the ground of competence to give advice and other assistance in the management of such classes or schools as may be established under the foregoing subsections."

The Secondary Education Act.

"6. The course of studies for high schools shall be fixed by regulations of the department, and shall include instruction in English, history, mathematics, ancient and modern languages, the natural sciences, commercial work, agriculture, manual, industrial and physical training, music and art, and such other subjects as may from time to time be determined upon. 1917, (second session) c. 31, s. 3.

No technical schools for the training of teachers to give instruction in manual training have as yet been

established in the province. All teachers who attend the provincial Normal Schools are required to take such work in manual training as prescribed. With the exception of a few of the larger centres such as Regina, Saskatoon, Prince Albert, and North Battleford not much progress has been made as yet in the way of providing equipment for manual training. From present indications, however, there would seem to be some justification for thinking that increased attention would be given to this work, more particularly in towns and cities, during the next few years. The fact exists that Saskatchewan being an agricultural province, the necessity for training along industrial lines does not seem so urgent as in some of the other provinces.

The materials provided are furnished by the respective school boards. If any of the students, however, wish to make some article for their own use they are required to provide the necessary material.

Provision is made for instruction in manual training in Grades I to VIII of the public school course. In the high school course it occupies a place on the list of optional subjects for the first two years, as follows:

First Year: Options—Any one of the following: Art, music, household science, manual training, commercial work (*either* stenography and typewriting *or* book-keeping, as indicated in Part I of the Commercial Course).

Second Year: Options—Any *one* of the following: Art, music, household science, manual training, commercial work (*either* stenography and typewriting *or* book-keeping as indicated in Part II of the Commercial course).

Up to the present time the subject has not been made compulsory. The courses as outlined for public and high schools are as given below:

(For rural and one-roomed schools)
Grades I, II and III

Modelling:

(a) Nature and art forms modelled in the solid—fruit and vegetables, animals, leaves, vessels and utensils, houses.

(b) Simple hollow vessel forms made by pressing out balls or coiling strips.

(c) Simple designs made from small balls and rolls.

(d) Geographical modelling—land and water forms.

(e) Illustration of stories, games, scenes.

Paper and Cardboard Construction:

(a) Tearing paper to represent objects.

(b) Folding paper to dictation.

(c) Cutting strips, fringes and pictures, to teach the use of scissors.

(d) Using colours in border designs.

(e) Assembling objects to form pictures.

(f) Construction of geometrical figures in colours, in illustration of primary and secondary colours.

(g) Construction of doll's house and furnishing the same.

(h) Making posters of scenes, games, stories.

Basketry:

(a) Simple weaving—mats, muffs, etc.

(b) Winding and braiding—picture frames, napkin rings, boxes, whisk holder, hat.

(c) Knotting—handbags, string bags.

Grades IV, V, VI, VII, VIII

Modelling:

Nature forms modelled in high relief on a background.

Pottery.

Designs modelled from historic ornament.

Geographical modelling—continents.

Illustration of scenes from history or literature.

Basketry:

Continuous coil—sewn raffia mats and baskets.

Sewn rattan mats and baskets—strap stitch, figure eight and lazy squaw.

Rattan baskets—single, double and triple weave.

NOTE—Certain rushes, reeds and grasses, if available, may be substituted for raffia in coil baskets. Willow may be used in place of rattan.

For Graded Schools

Grade I

Kindergarten occupations, such as stick laying, pea and stick work.

Modelling objects in clay or plasticine.

Paper work - tearing, folding and cutting.

Grade II

Modelling—paper folding, cutting, weaving and simple construction.
Simple weaving.

Grade III

Modelling—paper and thin cardboard construction.

Raffia -winding, braiding, basket weaving.

Weaving—raffia, cord, yarn.

Grade IV

Cardboard construction.

Basketry.

Thin woodwork.

Grade V

Simple bench woodwork from working drawings.

Grade VI

Bench woodwork from mechanical drawings.

Grade VII

Bench woodwork from mechanical drawings.

Simple metal work.

Grade VIII

Woodwork, including finishing.

Wood turning.

Simple metal work.

First Year—High School

Course for public schools reviewed and extended.

Modelling.

Bench work in wood.

Drawings: plan and elevations.

Reading blue prints.

Tools: uses, care of.

Second Year—High School

Work of first year continued and extended. Bench work in wood turning; seasoning; comparative strength of wood under varying conditions. Making useful articles for the school or for the home.

Simple metal work; sheet, bench, forge, lathe.

So far as grants are concerned a certain amount has been placed in the estimates for the past few years, and a pro rate apportionment is determined upon in accordance with the amount of equipment provided and the character of the instruction given.

Teachers who hold special certificates in manual training are, in accordance with the regulations governing special certificates, paid on the same basis as other members of the teaching staff.

BRITISH COLUMBIA

BY JOHN KYLE, ORGANIZER OF TECHNICAL EDUCATION

I HAVE much pleasure in describing the conditions under which the subject of manual training is taught in British Columbia and also giving a statement of grants which are given by the provincial government in support of the work in question.

The work is considered part of the

usual school curriculum, and the following statistics for 1917-18 may be of interest as showing what has been done in a large province with a sparse population.

64 manual training centres.

46 instructors of manual training.

6,255 pupils from elementary schools participating in the work.

964 pupils from high schools.

1. Where the board of school trustees of any rural school district or municipal school district provides suitable accommodation for manual training there is granted by the Council of Public Instruction a sum not exceeding one-half the total initial amount expended for the necessary equipment; the maximum grant paid amounts to five hundred dollars.

In addition to this the usual per capita grant paid to school trustees for the school teachers is also paid for manual instructors; viz.: sums varying from \$460 per teacher to cities of the first class to \$580 per teacher to rural school districts.

2. Every instructor in manual training must hold a British Columbia instructor's certificate of qualification.

(a) Temporary certificate valid until June 30 next after date of issue.

(b) Permanent certificate valid for life.

Every applicant for a permanent certificate must hold a first-class manual training certificate, and must hold a public school teacher's certificate or have had other approved professional training.

Certificates from similar institutions to the following are recognized:

Swedish diplomas (Naas),
German diploma (Leipsic)
City and Guilds of London

Institute (England),
Guelph College (Ontario),
Macdonald College (Quebec).

3. The size of equipment for rural school districts and cities vary in cost from about \$300 in rural schools to \$1,000 in cities. The projects made in centres also differ in character; those in rural districts being after the nature of carpentry exercises. While farm mechanics figure largely in the latter type yet the pedagogical side of the work is not neglected.

4. Lumber for manual training centres is always provided by the school board but if the cost of material for any projects amount to more than twenty or twenty-five cents, the pupil is asked to pay the remainder. Special woods for large projects are supplied by the pupils themselves.

5. Boys in the senior intermediate grade in the elementary school are usually instructed in woodwork; thus a three years' course can be completed by them before they go to high school. A diploma is awarded to those who finish the prescribed course successfully.

6. When manual training centres are established by school trustees attendance is compulsory and each child taking the course must attend one-half day per week.

The members of the manual training teacher's association of British Columbia have agreed upon a syllabus of fundamental operations which must be mastered by their pupils, and at the same time they wisely recommend freedom of action for each instructor in order that a course of exercises may be arranged to suit the demands of particular districts.

All schemes must be sanctioned by the Education Department.

THE DISTRIBUTION OF DAY-OLD CHICKS

QUEBEC

BY BROTHER M. LIGUORI, POULTRY DIVISION.

FOUR incubation stations have been established by the Quebec Department of Agriculture and they will act as centres of distribution for day-old chicks. It is hoped that 50,000 eggs may be passed through the incubators, in three hatches, the first of which started about March 10 so that the third hatching will not take place before May 15.

It is possible that a certain quantity of chicks may be sold to school boys and girls, but not a very large number. It will be necessary, in the first place, to satisfy the demand of the working population, which has

placed orders a long time ago for large quantities of day-old chicks. The Boys' and Girls' Circles are supplied with pure-bred eggs by the Department of Agriculture.

Chicks will be shipped by express when they have to be sent a long way. However, we are quite willing to make a fair trial of shipping by mail. As a general rule chicks are not shipped at long distances.

The farmers of the various districts may secure pure bred chicks from the poultry stations that have been established in almost every district of the province by the Department.

SASKATCHEWAN

BY R. K. BAKER, B.S.A., PROFESSOR OF POULTRY HUSBANDRY, COLLEGE OF AGRICULTURE

WE are not able to undertake to supply day-old chicks to members of boys' and girls' clubs or to others from the College flock this year, for the reason that of the different breeds we have less than five hundred birds and the demand for hatching eggs is so great that we do not expect it will be possible to provide chicks as well. It is necessary also that we increase our stock and this will require many eggs. If, however, we succeed in getting all the chicks we need for the College flock early in the season we expect to keep our incubators going until about the end of May. In

such a case we will be able to sell a limited number of chicks at that time. The demand for day-old chicks is strong, indeed we have had nearly one hundred inquiries already this season. There is also a keen demand for hatching eggs. We have about fifty inquiries from those who wish to buy incubator lots. Not only are eggs and chicks in great demand but we are entirely sold out of breeding males and could have sold perhaps one thousand females had we had them. This demand for superior stock, it will be recognized, augurs well for the future of the poultry industry.

ALBERTA

BY A. W. FOLEY, POULTRY SUPERINTENDENT

THIS Department does not supply day-old chicks to clubs or school children at present, although it is possible that at some future date this may be commenced,

as I believe it to be a much more satisfactory system than shipping out eggs for hatching to the school children.

Annually we receive orders for a

great many more chicks than we can supply. Last spring the following orders were filled:—

White Leghorn chicks..	460
Barred Rock “ ..	277
Buff Orpington “ ..	118
Rhode Island Red “ ..	100
White Wyandotte “ ..	75
<hr/>	
	1,030 chicks.

In addition to the chick orders filled, five hundred and forty-nine settings of eggs were shipped to customers.

Orders for chicks are limited to twenty-five and the price this spring is \$5 for 25 chicks. We already have received orders for as many chicks as were supplied last spring, and indications are that there will be a big demand for eggs, chicks, and breeding stock.

The chicks are shipped to all parts of the province in cardboard cartons marked “Live Chicks with Care,” From the Provincial Poultry Plant, Edmonton, Alberta.

GOPHER COMPETITIONS

MANITOBA

MANITOBA'S annual gopher contest this year began on April 1 and will continue until May 24. It is open to all the children of school age and will be conducted through the Boys, and Girls' Clubs of the province which are now operated in practically every school.

An interesting note book on gophers, written by Professor Jackson of the Agricultural College, is given to each member of the Boys' and Girls' Clubs entering this contest. It is well illustrated, shows the different kinds of gophers and how

to get them, and there accompanies it a form to be used as a record which is filled out by the teacher, who acts as banker and accountant in this work.

The gopher tails are handed in on Mondays, and weekly records are kept. On May 26 the teacher will submit the total statement and gopher record, and the Department of Agriculture will issue a cheque to the teacher covering the entire amount at the rate of 2½ cents per gopher tail.

SASKATCHEWAN

THE Weeds and Seeds Branch of the Saskatchewan Department of Agriculture has organized a competition for children in the killing of gophers. The organization covers the province more completely than during the two past years. The competition opens with the spring and will continue up to “Gopher Day” on May 24. It is open to Saskatchewan children up to eighteen years of age. The entry of the children will be made through the teachers of the public schools. The province is divided into thirty-six districts,

with two classes of schools in each district, those with an enrolment of eighteen and over and those with an enrolment of less than eighteen. On this basis, district school prizes, also provincial prizes, will be awarded. The school getting the most gophers in the province in one class wins a \$100 Victrola, and in the other class a \$100 Grafonola. The next highest school in the two classes each get a \$50 hot lunch outfit. The two schools third highest in the province will be awarded a special first aid equipment. Individual contestants in each district are divided

into two classes also, those over twelve years of age in one class, and those twelve years of age and under in the other. The child highest in each class in each district will receive a watch, the next highest will be awarded a thrift stamp book. The boy over twelve who gets the most gophers in the province will be given a \$50 bicycle, the boy under twelve will get a \$50 victory bond. Other prizes include a university scholarship, value \$100; baseball outfits, kodaks, gold watches, et cetera. Additional prizes include an agricultural scholarship of the University of Saskatchewan donated by the

Saskatchewan Co-operative Elevator Company, Limited. Awards will be based on the gophers taken and a series of essays by the contestants. At the close of the competition the ten contestants highest in each district, together with honour and first rank members of the Junior Agricultural Service League, over twelve years of age, will be eligible to enter for the university scholarship and victory bond. Many of the prizes are contributed by business firms and individuals while others are contributed by the provincial Department of Agriculture.

NEW BRUNSWICK

RURAL SCIENCE SCHOOLS

BY R. P. STEEVES, M.A., DIRECTOR, ELEMENTARY AGRICULTURAL EDUCATION

ARRANGEMENTS have been made for the holding of the New Brunswick Rural Science School for teachers during the four weeks commencing July 8th. The school will be held in the Agricultural School at Sussex. This school seeks to give a course helpful not only in the way of information regarding nature study and agriculture, but also in methods of instruction effective in securing interest and whereby educational value may be given. The prime object of nature study and agriculture as subjects in the course of instruction in our schools, is that they may aid in promoting good citizenship, that they may supply knowledge concerning the resources and industries on which the development of the country stands, and the training that brings into requisition all the powers and faculties of children in such a way that they may be able on leaving school, to intelligently connect themselves with occupations in which they are best qualified to succeed. Inevitably and properly patriotism plays an important part in this work. Necessarily in working for such an object special

training on the part of our teachers is highly desirable. With such special training there is bound to be developed among the pupils a bent of mind favourably disposed to our leading industry—agriculture, and a capability to grasp the importance of knowledge of the abstruse scientific principles underlying it.

Five sets of classes will be organized in the following named subjects, 1. Nature Study of Animals, 2. Plant Life and School Gardening, 3. Agricultural Chemistry, 4. Physical Nature and Environment, 5. Method of Instruction, Management and the Regulations of the School Law dealing with Nature Study and Agriculture.

To every teacher attending who successfully completes the session's work and who in the public schools of New Brunswick conducts agricultural instruction with school gardening under Regulation 50, for a period of one year subsequent to such attendance, a bonus of twenty dollars will be paid to assist in defraying expenses while taking such course.

There are no optional subjects. The full course embraces two sessions, at the satisfactory completion of

which, including the prescribed interim winter reading and experimental work, a certificate will be granted to each teacher.

As the course is a summer one conducted during the vacation, it is sought to make the teachers' stay at

the school pleasant and enjoyable. Social amusements, picnics, excursions and entertainment mingle with work to make the time pass pleasantly and profitably and with due regard to health conditions.

SASKATCHEWAN

BOYS' AND GIRLS' CLUB WORK

BY J. G. RAYNER, B.S.A., DIRECTOR BOYS' AND GIRLS' CLUBS

SASKATCHEWAN has not made as much progress as some of the other provinces in organization among boys' and girls' clubs. The work in this province has developed from within the school outwards and now after several years of successful school exhibition work the demand has come naturally for the club contest which may be regarded as a complement of the school work. In order to arrive at a satisfactory basis Mr. Fred. W. Bates, Director of Rural Education Associations and Fairs, and the writer have gone carefully into the question and are planning to co-operate to the fullest extent. It is felt that great advantage can be secured by co-operation, more especially in the work of organization, arranging exhibition dates, prize lists, educational meetings, providing judges, speakers, et cetera. The

young people's work is of such a nature that it naturally centres in the school. Hence the need for co-ordination in the direction of all these activities.

There being no club organization for the conduct of the work last year, every organization expressing a desire to help the boys and girls was asked to arrange for special contests for them and that special attention be given to pig and poultry raising, the growing of potatoes, gardening, and canning. Record books and other literature will be provided for each of these and we are planning to give demonstrations in canning to clubs taking up the gardening and canning contest, in so far as we find it possible to do so.

The following table, though not entirely complete, indicates what was accomplished last year:—

Name of Contest.	Members Enrolled				Total Members.	Total No. Exh.	Total No. Fairs.
	Boys		Girls				
	Mem.	Exh.	Mem.	Exh.			
Calf Raising	139	129	36	23	175	152	37
Pig Raising.....	245	153	83	43	328	196	35
Poultry Raising.....	289	269	139	120	428	389	28
Potato Growing.....	36	34	21	18	57	52	8
Stock Judging..	867	.....	139	.....	1,006	.....	59 pts.
Other Special Con- tests.....	21	21	.....	.....	21	.....	9 fairs.
Total.....	1,597	606	418	204	2,015	789	

The plan for developing the club work in Saskatchewan will be to co-operate very closely with the school exhibition movement. The school exhibition has developed very rapidly and efficiently since being recognized in a provincial way by the Department of Education. The needs of this new movement resulted in the birth of a new organization under the name of "Rural Education Association." While the organization of these associations has not kept pace with the school exhibition movement, it is the aim to have one eventually in every rural municipality in the province. The constitution of the association makes provision for the promotion of club work, and a study of its organization and purpose would seem to mark it as being the most suitable auspices for developing club work in the province. There are several reasons for this which if given might make the point more clear;

1. The Rural Education Association is an organization whose bounds are the bounds of the municipality and thus is the only organization in the province with clearly defined boundaries. This has obvious advantages.

2. The primary purpose of this organization is the closer linking of our education

to rural life. In other words, it aims to educate in terms of environment.

3. It endeavours to bring together all of the already existing organizations of the province. It provides for representation on its directorate of every organization and every class of people in the community.

4. It is an organization fostered by the Department of Education and thus further assures the clubs of the active support of the inspectors, teachers, and the entire school system of the province.

5. This association, where existent, takes direction of the school fair work and thus would be the logical auspices for the club work.

6. The aim is to have such an association in every rural municipality in the province.

The school exhibition organization of the province is such that each school is considered a unit; several units exhibit at the school fair which is held at some central point (usually the town or market centre) and winners from these fairs exhibit at what is called the central fair which is held at the central point in the inspectorate and takes in all the schools in the inspectorate. A similar plan will be followed for the club work. The central club will be located at the town or market centre and each school using this centre may be organized as a branch club.

"The school garden supplants or at least, supplements mere book training; presents real problems, with many interacting influences, affording a base for the study of all nature, thereby developing the creative faculties and encouraging natural enthusiasm; puts the child into touch and sympathy with its own realm; develops manual dexterity; begets regard for labour; conduces to health; expands the moral instinct by making a truthful and intimate presentation of natural phenomena and affairs; trains in accuracy and directness of observation; stimulates the love of nature; appeals to the art-sense; kindles interest in ownership; teaches garden-craft; evolves civic pride; sometimes affords a means of earning money; brings teacher and pupil into closer personal touch; works against vandalism; aids discipline by allowing natural exuberance to work off; arouses spontaneous interest in the school on the part of both pupils and parents; sets ideals for the home, thereby establishing one more bond of connection between the school and the community."

L. H. BAILEY.

PART IV

Special Contributions, Reports of Agricultural Organizations, Publications, and Notes.

A SCHOOL GARDEN ARMY

What is known as the United States School Garden Army has been organized by the United States Bureau of Education. The purposes of this army are twofold; (a) Increased food production and (b) training of school children in thrift, industry, service, patriotism, and responsibility.

The plan of organization involves;

(a) A general director, who is responsible for organization, propaganda, and administration.

(b) Regional directors, who are charged with the responsibility of writing instructions upon gardening that will enable supervisors and teachers to take a garden company successfully through a season, even though not expert gardeners. These instructions have been put out in leaflet form and sent from the central office to all who applied for them.

(c) Assistant regional directors, who work under the regional director and whose duties

are similar to those of the regional director, excepting that of writing garden leaflets.

(d) Co-operation with the State councils of defense through a State representative appointed by them.

The army plan or organization was adopted and has proved to be very popular and efficient. Simplicity of organization was desired, however, and but few of the divisions of the army were paralleled in the garden army plan.

A company consists of 150 garden soldiers as a maximum number. This number should be, and usually is, much smaller. Each company is entitled to a captain, a first and second lieutenant. A garden teacher is required for the company. The officers have been used to great advantage by many teachers in helping them on their reports, inspecting gardens, encouraging members of their company to do their full duty as true soldiers, and in arranging for exhibits, pageants, plays, etc.

ASSOCIATIONS AND SOCIETIES

EVENTS OF THE COMING MONTH

May 20, 21, 22, Sixth Canadian Good Roads Congress and Exhibition, Quebec. Secretary, Geo. A. McNamee, 909 New-Birks Building, Montreal.

May 27, 28, Alberta Bull Sale at Lacombe, secretary, E. L. Richardson, Calgary.

THE INTERNATIONAL ASSOCIATION OF REFRIGERATION

The International Association of Refrigeration was organized at a meeting held in Paris on January 29, 1909, following a movement which began at the first International Congress of Refrigeration, which also met in Paris in 1908, at the invitation of the French Government.

The object and aims of the association are briefly:

1. To be a kind of international clearing house of information respecting refrigeration and allied subjects.

2. To promote the study of the science of refrigeration, and the investigation of problems affecting the application of refrigeration to the industries.

3. To be the medium of communication between the national associations of refrigeration in different countries.

4. To organize and carry out an International Congress every three years, constituting a plenary meeting of governments, scientists and manufacturers, interested in the matter of refrigeration, and to ensure the publication of reports of these international meetings.

In connection with the organization of the International Association it was suggested that the different adhering countries should organize National Associations of Refrigeration, and the suggestion has been carried out in most of the countries concerned. There

are now some 33 or 34 countries supporting the International Association, either through their governments or by voluntary associations and private members. Canada has been a "membre donateur" of the association since its organization, with Mr. J. A. Ruddick, Dairy and Cold Storage Commissioner, as the accredited representative.

The revenue of the association is made up of annual donations from governments and membership fees, the largest amount being contributed by the Argentine Republic in the sum of 10,100 francs. The annual fee for private membership is 20 francs.

The association publishes a monthly bulletin in French and English, which is distributed to all members. The bulletin contains a review of all current literature on the subject of refrigeration; reports of investigations; and general news respecting cold storage and refrigerated transport throughout the world. The information thus supplied is very valuable to officers of the department who have to deal with these subjects.

Article 5 of the statutes of the association provide for the expulsion of any member who

has been guilty of dishonourable acts, or who has in any way become objectionable. At a meeting of the administrators held in London in October last it was decided to take advantage of this article to expel the government of Germany, Austria-Hungary, Bulgaria and Turkey. This move necessitates the re-organization of the association and a revision of the scale of contributions. The Government of Canada has agreed to continue as a "member donateur" of the association under re-organization.

COUNTRIES AFFILIATED TO THE ASSOCIATION

French West Africa, Argentina, Commonwealth of Australia, Belgium, Brazil, Canada, Chili, China, Denmark, Egypt, France, Great Britain, Greece, Guatemala, French Indo-China, Italy, Japan, Luxemburg, Madagascar-Mexico, Monaco, Netherlands, New South Wales, New Zealand, Norway, Paraguay, Peru, Portugal, Queensland, Roumania, Russia, Servia, Spain, Sweden, Switzerland, United States, Uruguay.

CANADIAN ABERDEEN ANGUS ASSOCIATION

The annual meeting of the Canadian Aberdeen Angus Association was held in Brandon on March 7. It was decided to recommend to the Cattle Breeders' Association of Manitoba to change the plan of holding one big sale of all beef breeds to holding separate sales for each of the breeds of Shorthorns, Herefords and Aberdeen

Angus. Five hundred dollars was voted to cover the preliminary expense of the Angus sale next spring. Eight hundred dollars was voted towards starting futurity classes for Aberdeen Angus calves at Canadian shows.

The following officers were elected: President, Jas. D. McGregor, Brandon, Man.; secretary, W. I. Smale, Brandon, Man.

NATIONAL LIVE STOCK RECORDS

The annual meeting of the Canadian National Live Stock Record Association was held in Toronto on April 7th. A resolution was passed asking the federal government to raise the grant for live stock prizes at the larger exhibitions from \$3,500 to \$5,000, which was the amount granted previous to 1918. A resolution was adopted recommending that the government endeavour to have amended the basis of weights charged against transportation of bulls, in the direction of having the animals carried

by actual weight instead of a fixed weight according to age.

The officers were re-elected as follows: Chairman, Wm. Smith, M.P., Columbus; representing heavy horses, Peter White K.C., Toronto; dairy cattle, W. F. Stephen, Huntingdon, Que.; beef cattle, Robert Miller, Stouffville, Ont.; light horses, Robert Ness, Howick, Que.; sheep, J. M. Gardhouse, Westor, Ont.; swine, J. E. Brethour, Burford, Ont.; secretary-treasurer, John W. Brant, Ottawa.

CANADIAN COUNCIL OF AGRICULTURE

The annual meeting of the Canadian Council of Agriculture was held in Winnipeg during the first three days of April. Representatives of the Interprovincial Council of Farm Women recommended that a women's section of the council be formed. In response the council gave notice that at its next meeting an amendment to the constitution will be introduced providing for an increase in the number of representatives of each

association in membership by adding thereto a representative of its women's section. Besides resolutions concerning the tariff, daylight saving, transportation and grain legislation, a resolution was passed asking the president of the council to appoint a committee to investigate conditions concerning the live stock industry and report to the council as occasion warrants; and that this committee be further empowered,

when so instructed by the executive, to act with the live stock associations of the several provinces.

The following officers were elected: Presi-

dent, H. W. Wood, Calgary; vice-president, Roderick McKenzie, Winnipeg; secretary, Norman P. Lambert, Winnipeg.

MARITIME STOCK BREEDERS' ASSOCIATION

The annual meeting of the Maritime Stock Breeders' Association was held at Truro during the first week in March. It was decided to resume the holding of the Maritime Winter Fair at Amherst that was held annually previous to the war, since when the winter fair building has been occupied by troops.

The following officers were elected:— President, A. F. Trites, Salisbury; vice-president for Nova Scotia, S. A. Logan, Amherst; vice-president for New Brunswick, W. W. Hubbard, Fredericton; vice-president for Prince Edward Island, J. M. Laird, Kelvingrove; secretary-manager, F. L. Fuller, Truro.

NOVA SCOTIA FARMERS' ASSOCIATION

The twenty-third annual meeting of the Nova Scotia Farmers' Association was held at Truro in the middle of March. Among resolutions passed was one recommending the standardizing of farm machinery. Another resolution was designed to compel

owners of first prize animals at the smaller fairs to compete at the provincial exhibition.

The following officers were elected:— President, D. R. Nicholson, Coxheath; vice-president, J. Howe Cox, Cambridge Station; secretary, C. R. B. Bryan, Truro.

NEW BRUNSWICK SEED EXHIBITION

The New Brunswick Provincial Seed Exhibition was held at Fredericton on March 13 under the auspices of the New Brunswick Farmers' and Dairymen's Association. The exhibits of wheat and oats exceeded the varieties of any previous year. The garden seeds displayed were not so well represented as heretofore. The York County Seed Growers held their annual seed fair in conjunction with the provincial exhibition. A

feature of the fair was the display exhibited by the Dominion Experimental Station at Fredericton. It contained examples of the different varieties of potatoes, grain, and fodder crops commonly grown in the province. The judging was done by Mr. E. P. Bradt, Secretary for Agriculture, O. C. Hicks, Instructor of Soils and Crops, and E. M. Taylor and James Bremner, Jr., agricultural representatives.

NEW BRUNSWICK BEEKEEPERS' ASSOCIATION

At the annual meeting of the New Brunswick Beekeepers' Association held at Fredericton in March a resolution was passed asking that the sale of honey substitutes be prohibited unless the container bears the label "not bees' honey" and a statement of the

materials used in the manufacture of the product.

The following officers were elected:— President, Geo. L. Pugh, Nashwaaksis; vice-president, H. B. Williams, Tracey Station; secretary, L. T. Floyd, Department of Agriculture, Fredericton.

NEW BRUNSWICK FRUIT GROWERS' CONVENTION

The fourteenth annual meeting of the New Brunswick Fruit Growers' Association was held in Fredericton at the beginning of April. The President commented favourably on the experience of the association in the co-operative shipment of apples and the co-operative purchase of growers' requirements for the members. A resolution was passed asking that the association be incorporated under special charter of the legislature and that a suitable annual grant be provided. The resolution further provided that failing

this incorporation an application be made to have the association incorporated as an agricultural society. It was also resolved that the staff of the Provincial Horticulturist be strengthened and include an officer to carry on organization and instruction in the growing and handling of soft fruits.

The following officers were elected:— President, Lt.-Col. O. W. Wetmore, Clifton, Kings Co.; secretary, A. G. Turney, Provincial Horticulturist, Fredericton.

THE ONTARIO VEGETABLE GROWERS' COMPETITIONS

Both field crop and garden competitions will be carried out by the Ontario Vegetable Growers' Association this year. For the purposes of these competitions the province is divided into five districts. In the garden competition five prizes are offered running from thirty dollars to five dollars and in the field competition six awards are to be made ranging from twenty to ten dollars. Judges will be supplied by the Ontario Department of Agriculture.

THE GARDEN COMPETITION

In the garden competition not less than three acres can be used but if a greater

acreage is occupied the whole will be judged. The judging will be done in two visits the first not later than July 10 and the second not later than August 10.

FIELD CROP COMPETITIONS

The field crop competitions are open to the growing of cabbage, celery, muskmelon, onions, potatoes and tomatoes. Competitors may use any or all of these crops of each of which not less than one-eighth of an acre in one block must be grown. Cabbage will be judged about June 15, potatoes not later than July 15 and celery, onions, musk-melons and tomatoes about the 10 of August.

MANITOBA POTATO GROWERS' ASSOCIATION

A provincial Potato Growers' Association was formed in Manitoba at the beginning of April. It was decided to ask the Dominion Department of Agriculture to establish a standard of varieties and grades of potatoes for the Dominion. The association recommended for Manitoba the Early Ohio, the

Beauty of Hebron, Irish Cobbler, and Green Mountain varieties.

The following officers were elected:—President, G. H. Whellans, East Kildonan; vice-president, R. P. Andrews, Bird's Hill; secretary, Professor F. H. Brodrick, Agricultural College, Winnipeg.

THE SHORTHORN CONGRESS

A Shorthorn Congress consisting of a show and sale was held at Brandon, Manitoba, on April 3rd and 4th. The congress represented breeders and their herds in the provinces of Manitoba, Saskatchewan and Alberta. It was organized to provide a means of disposing of Shorthorn cattle of superior quality with a view to stimulating an increase in the production of this sort which it is hoped will later be reflected in the commercial cattle of the three Prairie Provinces. The congress was honoured by the presence of the president of the American Shorthorn Breeders' Association and of the president and secretary of the Dominion Shorthorn Breeders' Association, besides many prominent breeders from the United States and Western Canada.

The selection of the animals for the congress was left largely in the hands of the

secretaries of the provincial Shorthorn associations who saw to it that inferior animals were not accepted. The Show was held on the first day when the judging was done by Professor G. E. Day, Secretary of the Dominion Shorthorn Breeders' Association. In all 97 animals were sold, 27 of which were bulls which brought an average of \$554.00. The females brought an average of \$663.00. The highest price for bulls was \$1,250 which was paid by Mr. J. G. Clark of Clark Manor, Alberta, for Myrtle Beau, a junior yearling contributed by Mr. J. B. Davidson of Myrtle, Man. The highest price for a female was \$3,100 paid by C. G. Beeching, DeWinton, Alberta, for Dale's May, a junior yearling contributed by the Honourable Duncan Marshall, Minister of Agriculture for Alberta.

SASKATCHEWAN CATTLE BREEDERS' SALE

The annual sale of the Saskatchewan Cattle Breeders' Association was held at Regina on March 12 and 13. The offerings, which numbered 241 males and 90 females, were brought out in better condition than at previous sales. The stock was widely distributed, a large percentage of it being purchased by farmers in the northern part of the province. The yearling Shorthorn bull, Marshall Haig, brought the highest

price of \$1,500, the average for all of the Shorthorn males being \$219.94 and for females \$219.40. Royal Britisher, also a yearling, brought the highest price for Herefords, being sold for \$850. The average for bulls of this breed was \$302.50, and for females \$209.38. The Aberdeen Angus, Major McRae, brought \$500, the average for this breed being \$178.27.

SASKATCHEWAN ABERDEEN-ANGUS ASSOCIATION

The breeders of Aberdeen-Angus cattle in the province of Saskatchewan have formed a provincial association.

The following officers were elected:—

President, James Brown, Neudorf; vice-president, E. C. Woods, Warman; secretary, J. N. Buffum, Bechard.

ALBERTA HORSE BREEDERS' ASSOCIATION

The twenty-first annual meeting of the Alberta Horse Breeders' Association was held in Calgary on March 25. The Honourable Duncan Marshall, Minister of Agriculture, explained in detail to the meeting the proposition which he had brought before the legislature and the appropriation of \$35,000 that had been made for the purchase of two superior stallions, one of Clydesdale and the other of Percheron breeding. These would

be used to improve the horse stock of the province. Mr. Marshall further announced that the Percheron and Clydesdale Breeders' Associations had been asked to appoint committees to assist in making a selection of the stallions.

The following officers were elected: President, David Thorburn, DeWinton; vice-president, E. D. Adams, Calgary, secretary, E. L. Richardson, Calgary.

ALBERTA CATTLE BREEDERS' ASSOCIATION

The annual meeting of the Alberta Cattle Breeders' Associations was held in Calgary on April 7th. A plan was adopted whereby representatives from each of the provinces and Cattle Breeders' Associations would co-operate with the officials of the Alberta University in obtaining steers of high quality to be fed at the University for exhibition purposes.

The following officers were elected:— President, S. M. Mace, High River; 1st vice president, Frank Collicutt, Calgary; 2nd vice president, J. L. Walters, Clive; secretary-treasurer, E. L. Richardson, Calgary. Miss E. Cora Hind of Winnipeg, and Miss Jean Grant of Calgary were elected associate directors.

CALGARY BULL SALE

The annual bull sale held at Calgary by the Alberta Cattle Breeders' Association took place on April 7th to 10th. The animals sold numbered 652 and comprised Red Polled, Galloway, Hereford, Shorthorn and Aberdeen Angus. The following table shows the number of each breed and the total and average prices received:

Breed	No.	Total	Average
		\$ cts.	\$ cts.
Red Polled.	5	750 00	150 00
Galloways.	220	54,635 00	248 34
Herefords	329	73,535 00	223 51
Aberdeen Angus	98	17,950 00	183 16
	652	146,870 00	225 26

The highest priced Hereford was Willow Spring contributed by Frank Collicutt, Calgary and purchased by T. F. Cadzow of Edmonton for \$1,600. The highest price for a Shorthorn was \$3,800 paid for Kinmel Captain contributed by T. Bertram, Ralphs, and purchased by Davidson Bros. of Red Willow. The highest priced Aberdeen Angus was Donald of Hartburn which brought \$750, contributed by A. E. Noad of Olds and purchased by R. R. Lea of Coaldale.

NEW PUBLICATIONS**DOMINION DEPARTMENT OF AGRICULTURE****THE EXPERIMENTAL FARMS.**

Hotbeds and Cold Frames.—Bulletin No. 19 by W. T. Macoun, Dominion Horticulturist, explains the making and use of hotbeds and cold frames in the growing of vegetables and flowers. Outside and sectional views of a hotbed are shown.

BRITISH COLUMBIA

Boys' and Girls' Competitions.—Bulletin No. 81 of the British Columbia Department of Agriculture, contains an outline of the work of the boys, and girls' competitions in

1919, giving the rules and regulations for each, which include pig raising, calf raising, poultry raising, potato growing, and fodder corn growing.

Elementary Agricultural Education.—The report of the Director of Elementary Agricultural Education for the Province of British Columbia for the year 1918, describes what was accomplished through the schools in school gardening, school fairs, and high school agricultural courses.

MISCELLANEOUS

Soils, Their Property and Management. written jointly by the Professor of Soil Technology, the Extension Professor of Soil Technology, and the Assistant Professor

of Soil Technology, Cornell University, constitutes a text book that in its thirty-one chapters covers the whole range from soil forming processes to tillage, irrigation, dry farming, and soil survey. In addition to its

764 pages of reading matter containing illustrations, it contains a map showing the soil provinces and soil regions of the United States. The book is published by the Macmillan Company of Canada.

NOTES

Alberta had, at the end of 1918, 235 women's institutes with a membership of 9,250. Upwards of forty of these institutes have established rest rooms.

In the county of Wellington, Ontario, ten farmers' clubs are said to be shipping live stock co-operatively and buying seed grain for their members on a similar plan.

Mr. W. J. Elliott, B.S.A., Principal of the Agricultural School at Olds, Alberta, has resigned his position to accept an appointment with the United Grain Growers, Ltd.

The Boys' and Girls' Shorthorn Calf Club in Halton County has got well under way, as about 30 pure-bred young heifers, chiefly of Scotch breeding, were recently taken up by the youthful members.

Dr. F. C. Harrison, Principal of Macdonald College, has gone to England to give his services to the Khaki University of Canada in connection with agricultural education and the settlement of returned soldiers on Canadian farms.

The agricultural representative for Welland County, Ontario, reports that a farmer in his county, by a systematic test and weeding out, increased the yield of milk in his herd in 1918 48 per cent over 1917 from the same number of cows.

The policy of reconstruction of agricultural education being put into effect by the British Board of Agriculture provides that for every pound provided in promoting agricultural education by a local authority, the government will add at least two pounds.

The British Columbia Department of Agriculture has decided to discontinue for this season the holding of field crop competitions. Farmers' Institutes which desire to hold these under their own management will be afforded judges by the Department.

Dr. A. T. Charron, for a number of years first assistant chemist at the Central Experimental Farm, and more recently attached to the Department of Agriculture of Quebec, has been appointed Superintendent of the Dairy School at St. Hyacinthe, Que., succeeding the late O. E. Dalaire.

The Department of Agriculture of British Columbia has adopted the principle of maintaining district poultry instructors. Mr. H. E. Upton of that Department has been appointed Instructor for the Lower Mainland

on both sides of the Fraser River, with headquarters at New Westminster.

Last year New Brunswick had 98 school gardens, varying in size according to the number of pupils in the schools and other considerations, from 24,000 sq. ft. to one-quarter of an acre. These were located on the school grounds chiefly and in a few cases, where the school grounds were not suitable, at convenient points nearby.

Under the policy whereby the federal Department of Agriculture defrayed half the cost of transportation on live stock moved north, where feed was plentiful, and feed moved south, where it was scarce, in the province of Alberta, there was moved northward 31,350 cattle and 59,400 sheep. The amount of hay and green feed moved southward is given as 116,328 tons.

In the province of Manitoba there are 220 boys' and girls' clubs and 1,100 branch clubs embracing in all 25,000 members who, last year, engaged in one or more of the club activities which include gardening and the raising of pigs, sheep, calves and poultry and in other agricultural pursuits. In the pig clubs three thousand pigs were raised and two thousand of them were shown at the boys' and girls' club fairs.

Mr. F. L. Ferguson, B.S.A., has been appointed as Lecturer in Physics at the Ontario Agricultural College in succession to W. H. Scott, deceased. In addition to his lecture work Mr. Ferguson will have immediate supervision of the drainage propaganda carried on in the province. He has already had considerable experience in drainage work, having served on the drainage staff as an undergraduate and having held a position as drainage surveyor under his predecessor for the past year or more with headquarters at Chatham.

Mr. Frank E. Millen, B.S.A., has been appointed Professor of Apiculture at the Ontario Agricultural College, Guelph, in succession to Dr. Burton Gates. Mr. Millen graduated from the Ontario Agricultural College a few years ago and as an undergraduate specialized in beekeeping and did work from time to time for the department in this connection. After graduating he held positions in apiculture on the staff of the Agricultural College at Lansing and latterly on the staff of the Agricultural College at Ames, Iowa. He will act as Provincial Apiarist in addition to his duties on the college staff.

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Guard Against Apple Powdery Mildew. J. W. Eastham, Provincial Plant Pathologist, page 44.

Know the Value of Crops. Professor Lionel Stevenson, Dominion Experimental Station, Sidney, B.C., page 45.

The Queen of Fruits. E. W. White, Assistant Horticulturist, Department of Agriculture, page 47.

The Canadian Countryman, Toronto, Ont., Mar. 22.

Practical Pointers on Operating the Incubator. M. A. Jull, Manager and Lecturer, Poultry Department, Macdonald College, page 5.

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Construction and Equipment of the Dairy Barn. E. S. Archibald, B.S.A., Dominion Animal Husbandman, page 3.

The Milking Machine and Clean Milk. H. H. Dean, Professor of Dairy Husbandry, Ontario Agricultural College, page 5.

A Review of the Dairy Industry. J. A. Ruddick, Dominion Dairy Commissioner, page 8.

Pointers on Growing Grain Crops. John Fixter, Supervisor, Illustration Stations, Central Experimental Farm, page 9.

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Some of the Best Varieties of Farm Crops. Dr. C. A. Zavitz, Professor of Field Husbandry, Ontario Agricultural College, page 3.

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The Canadian Horticulturist and Beekeeper, Peterboro, Ont.

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The Relation of Winter Injury to Soil Fertility. J. W. Crow, Professor of Horticulture, Ontario Agricultural College, page 57.

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April.

Report of Poultry Marketing Commissioner, Mr. J. H. Hare, for the Province of Alberta, page 192b.

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essor, Agricultural Engineering, University of Saskatchewan, Saskatoon, page 12.

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Make Tractor Ratings Uniform. Professor J. McGregor Smith, page 52.

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Bee-Keeping in Central Alberta. B. C. Milne, B.S.A., Superintendent, Experimental Station, Lacombe, Alta., page 290.

The Grain Growers' Guide, Winnipeg, Man.

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Rural Credit in Western Canada. E. A. Weir, Agricultural Director, Rural Credit Societies, Winnipeg, Man., page 25.

Rural Credit Societies. E. A. Weir, page 38.

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Handicaps Must be Removed. Declaration from Hon. T. A. Crerar, Minister of Agriculture of Canada, page 42.

The Journal of Agriculture and Horticulture, Quebec, Que.

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The Maritime Farmer and Co-operative Dairyman, Sussex, N.B.

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Growing Pea-Fed Bacon Hogs in New Brunswick. O. C. Hicks, B.S.A., Instructor of Soils, Department of Agriculture, page 762.

PART V

The International Institute of Agriculture

FOREIGN AGRICULTURAL INTELLIGENCE

All communications in regard to this section should be addressed to T. K. Doherty, International Institute Commissioner, Department of Agriculture, West Block, Ottawa.

SCIENCE AND PRACTICE OF AGRICULTURE

MECHANICAL PLOUGHING¹

METHODS FOR PLOUGHING IN RIDGES

By A. TARCHETTI

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PLOUGHING IN RIDGES

This is the most usual method of ploughing in Italian soils, especially for irrigated crops, and it is also that most suited to the great majority of motor-or tractor-ploughs imported from the United States, that is, ploughs turning the soil to one side only (with a single mould-board, right-or left-handed).

This system may be used with balance, turn-wrest and double brabant ploughs

without ridges does not allow of good work and, to preserve the ridges, it is necessary to resort to gathering up and casting.

It should first be noted that, in ploughing without ridges, the drainage-furrows are left at the same place each year whilst with the second method (gathering-up and casting) the open furrows are displaced each time the ground is ploughed: the furrows a , a' , a'' , . (Fig. 1) are filled up on gathering-up and, on casting, an equal number of new open furrows corresponding to the median axes, x , x' , x'' . of the ridges are opened, at the place where the summit of the ridges was previously. This fact, as will be seen later, has considerable influence on the method to be followed in ploughing.

Ploughing in ridges can also be carried out with balance, turn-wrest and double-brabant ploughs. In this case the half-

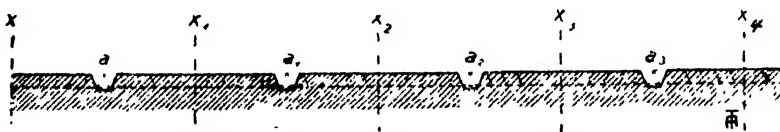


Fig. 1 —Displacement of the open furrows each time ground is ploughed.

when the open furrows separating the ridges are narrow and shallow. In this case, provided care is taken that the plough wheels do not fall into the open furrow, the ordinary method of ploughing without ridges may be carried out, neglecting the open furrows (especially if a gang plough or, better still, cable traction is used), which will only be partially filled up, thus leaving a depression which will serve as a guide when the open furrow is reopened or put right with an ordinary plough.

But when the open furrows are large and deep and when the ground must be maintained perfectly level—as is the rule for the rice fields of upper Italy—ploughing

ridge ax , is ploughed, after which, leaving the half-ridge ax' , the half-ridge $a'x'$, is ploughed, and so on, so as to plough all the half-ridges to the left of the open furrows. When the last but one half-ridge — $a''x''$ — is ploughed, the ploughs are *turned*, so that those that turned the soil to right in going now turn to the left on the return, or vice-versa, i.e., the last half-ridge $a''x''$ is ploughed, then $a''x'''$, etc., up to the second, ax' , which completes the work. But this method leads to loss of time and awkward turns (with cable anchorages, it is practically impossible), so that ploughing in ridges is reserved for machines with ploughs having but a single mould-board.

Before examining the method of procedure in each case it will be advisable to recall certain considerations.

¹The first two parts of this article appeared in the March and April numbers of the *Agricultural Gazette*.

In our (Italian) soils it is almost impossible to complete the mechanical ploughing of the ridges. Above all, the machines, especially with gang ploughs, are unsuitable for opening the first furrows along the open furrow and, to make sure of the regularity of the following ploughing, it is always advisable to carry out the work first gathering up the open furrows to the left and right with an ordinary plough. Again, the ordinary machines cannot finish the ploughing or as the farmer says, cannot *close* it. In fact, if the three commonest types of machines in Italy (Fig. 2) are considered, it will be seen that each of them has to leave unploughed a more or less wide strip (12 to 39 in. and more) in every ridge, unless the wheels pass over the ground already ploughed, which would be detrimental. On the other hand it is very difficult to finish such a narrow strip for the resistance of the soil is not

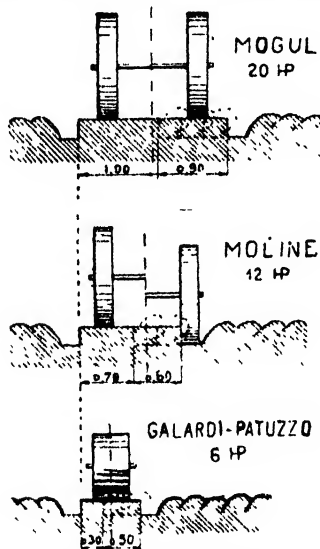


Fig. 2.—The strip left unploughed by various machines.

equal for all the ploughs, so that they would slip sideways. On the contrary, with the stilt plough it is easier to correct the unavoidable irregularities of the strip and to open, exactly in the middle of the ridge, a straight furrow of uniform width.

In order that this strip may be ploughed as well, it is necessary that the machine should haul a gang of such a width that the total width ploughed is equal to or even greater than the distance between the driving wheels, which would give the mechanical advantage of displacing the centre of resistance towards the centre of power; but in our (Italian) soils, and in the case of direct haulage, the difficulties of gripping the soil are in opposition to this.

Thus, it should be reckoned that, for each ridge (Fig. 3), independently of its width L , a total width of from 39 to 63 in. cannot

be ploughed mechanically in practice, so that with ridges only 10 to 13 ft. wide for example, about half the field would have to be ploughed with teams. As a result the width of L should be kept as large as possible, which gives the driver the extra advantage of avoiding too narrow turns and of enabling him to obtain, with the more continuous and uniform handling, more regular ploughing. It is hardly necessary to add that the width of the ridges should be such that the width A is a multiple of the width of the gang.

On the other hand, however, there are two considerations in opposition to the excessive increase of the width of the ridges; these are as follows:—

(1) *The total journey with the ploughs lifted* on the headlands at the head of the ridges is not proportional to the width of these latter, but, as Prof. RINGLEMANN has justly remarked ⁽¹⁾, increase in an arithmetical progression. In fact, let us take a machine ploughing a strip 47 in. wide, and let us suppose for the sake of simplicity that the axis of the machine (generally the centre of power) coincides with the centre of that strip (that is, with the centre of resistance of the gang) and that the machine can

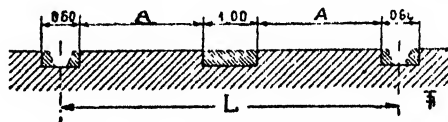


Fig. 3.—Plan of ground to be ploughed with a team

“close” the ploughing completely. Let us consider what takes place on one-half of the headland at the head of the ridge:—as that is repeated on the other half of the same headland and on the two halves of the opposite headland, there will be 4 equal operations for each headland. If the ridge is, for example, 23 ft. 6 in. wide, or 11 ft. 9 in. for each half (Fig. 4), the machine will plough the half-ridge in 3 journeys, that is, in order to arrive at the first furrow (gathering-up) it would have to move a distance of 10 ft. on the chief headland, and then turn at right angles so as to begin the first furrow at *a*. When it returns on the same headland to begin the second furrow, it will have to move 5 ft. 11 in., and, finally, for the third furrow 2 ft. In the three journeys it has thus moved a distance of 17 ft. 8 in. on the edge of the field.

If the ridge is double-width ($L = 47$ ft. 3 in.; $L/2 = 23$ ft. 7 in.) the machine will plough the half-ridge in six journeys, but the various journeys (Fig. 5) will be respectively 20 ft. 10 in., 18 ft. 2 in., 13 ft. 9 in., and the total distance travelled will be 70 ft. 10 in., that is to say, not double, but four times the previous one.

⁽¹⁾ See the *Journal d'Agriculture pratique*, 1917, p. 436

The total distance travelled with the ploughs lifted along a half-headland is thus equal to the product of the average journey ($L/4$) and the number of journeys,

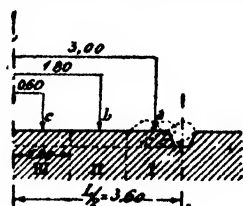


Fig. 4. Ploughing a half-ridge, 11 ft. 0 in wide, in 3 turns.

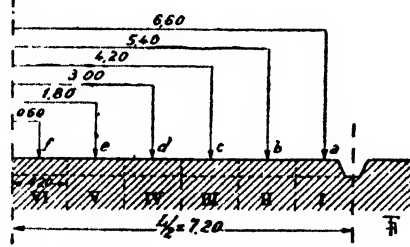


Fig. 5. Ploughing a half-ridge, 23 ft. 6 in wide, in 6 turns.

or, speaking algebraically, the sum of the terms of an arithmetical progression whose first term is half the width of the strip ploughed (or of the gang), whilst the ratio or difference is that of the width itself (l).

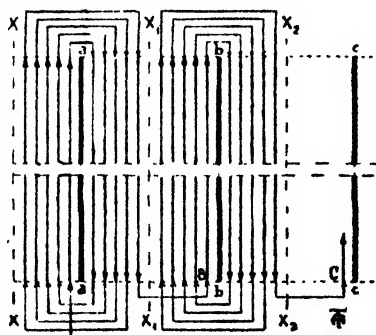


Fig. 6.—Gathering-up a ridge.

The result is that the time lost and fuel consumed on the journeys with the ploughs lifted are the greater as the ridge is wider, and it is with reason that Prof. Ringelmann proposes a width of 98 feet (in practice not more than 66 ft.) as a maximum, also with

¹Prof. Ringelmann considers the width of the gang or strip ploughed as the first term of the progression, and thus obtains, in his calculations, figures that are rather too high, on the contrary, however, we, on the assumption that the axis of the machine coincides with that of the gang, have obtained figures that are rather too low, but which we consider are nearer to practical conditions.

the idea of avoiding excessive injury to the headlands by repeated passage of the machine.

2. The width of the ridges nearly always depends on the nature of the ground or crop, as well as on the form of the field.

On account of this necessity for width of the ridges, the ploughing has nearly always to be carried out in a special way, which is also necessary and quite distinct for each case.

If one uses a machine with a central gripping drum (Galardi-Patuzzo type motor-ploughs) which can pivot on the drum itself, the width of the ridge has no influence, and the work can be carried out as with the ordinary stilt plough. In fact, in the case of a ridge limited by the open furrows *aa* *bb* (Fig. 6) the work is begun at *A* in the direction of the arrow by gathering up the last furrow to the right, then passing to the other side of the last furrow, always gathering up to the right (if the plough throws to the right) and continuing in this way until, having arrived near the middle *XX* (where the strip to be finished with a team is shown wider), the machine passes at *B* to the last furrow *bb*, where the operation is repeated.¹

The ploughing may also be carried out as shown in Fig. 7, i.e., casting instead of gathering up.

But if the machine, as often happens, is a tractor plough or a gang motor plough, which has to turn in a semi-circle with a well defined minimum radius (generally of 20 to 26 ft.), in this case and according to the width of the ridges, the method to be followed must be decided upon clearly beforehand, so that the work may

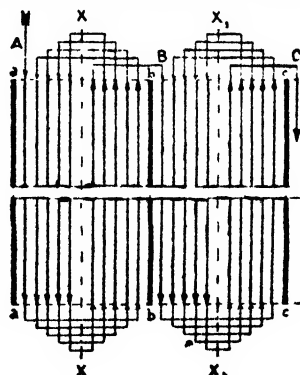


Fig. 7.—Casting a ridge.

be finished without requiring useless double turns and journeys with the ploughs lifted.

We add a few solutions of the commonest cases where, for the sake of simplicity, a series of only 3 gangs or furrow-slices are represented for each zone where the manoeuvre is repeated.

Admitting that a strip equal to a half or whole ridge should be left in the field at the

¹In this and the following figures, the journeys normal to the furrow slices are spaced for the sake of clearness, but it is obvious that in the field they are superimposed, the machine always travelling on the same line on the chief headland.

edge of the first and last furrows to enable the machine to pass to finish the headlands (²), the internal limit of that strip may be assumed to be the edge of the field; this is why the beginning and end of the ploughing as has been already said previously, coincides in the following figures, now with an open furrow (solution A), now with the centre of the ridge (solution B).

In all the examples the ploughs are understood to turn the soil to the right, which is usually the case.

Case I.—Ridges wider than 82 feet (at least 2 are necessary).—It will be convenient to consider the ridge as divided into four zones or parts, each of which corresponds to a fresh manoeuvre.

CASE I: Ridges wider than 82 feet.

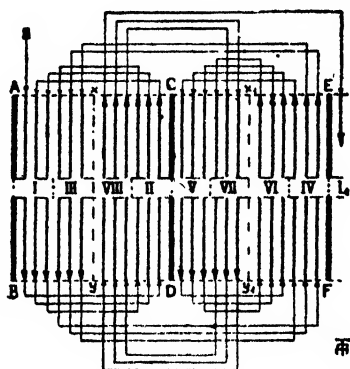


Fig. 8.—Solution A.

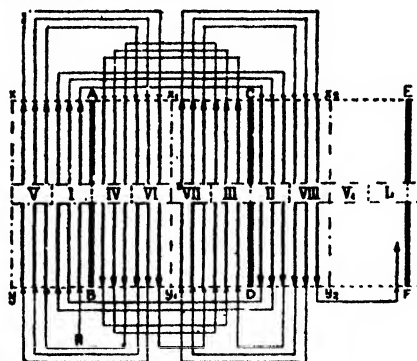


Fig. 9.—Solution B

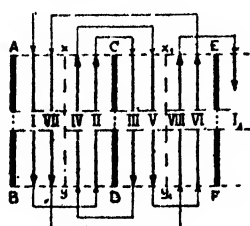


Fig. 10.

Variants of Solution A.

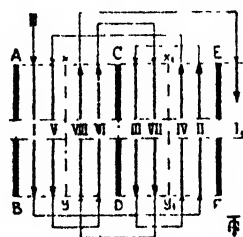


Fig. 11.

Solution A (Fig. 8).—Ploughing is begun at A by gathering up the open furrow AB; at B, the end of the furrow, the gang is lifted, and the machine turns to the left, and, at D, begins gathering up the second open furrow, up to C. There the gang is again lifted, the machine turns always to the left, and the ploughs are earthed to the right of the first open furrow, and so on, going in the direction of the arrows, passing in turn from zone I to zone II, from zone II to zone III, from III to IV, etc., until, having turned the furrow of zone VIII nearest to the axis xy of the first ridge, the machine passes to the third ridge

and begins ploughing the third and fourth ridges at E, as has been done for the first two turns. On the sides of the median axes xy, x, y, the usual strip some 31 to 59 in. wide will remain to be ploughed with a team.

The narrowest turn (from 16 to 23 ft.) is only made in the first passage from zone VI to zone VII and corresponds to about one-quarter the width of the ridge.

Solution B (Fig. 9).—Beginning at B, end near the axis $X^2 Y^2$. Two minimum turns—in the first passage from zone II to zone III and from zone VI to zone VII.

When the ridges are wider than 82 ft., the ploughing can be carried out in different ways; thus, for example, Figs. 10 and 11

show two variants, limited, for brevity, to solution A and showing only one furrow per zone. In both cases, the total journey with the ploughs lifted on the headlands is slightly more than in the case of Fig. 8; however, in the variant shown in Fig. 11, the minimum turns include half a ridge, that is, they can be carried out in the space of about 40 ft.

Case II.—Ridges from 49 to 82 feet wide (at least three are necessary).—In this and the following cases, the work is divided into two sections per ridge, that is, at the middle of the last furrow and vice-versa.

Solution A (Fig. 12).—There are two minimum turns (of 11 to 23 ft.) corresponding to about half the width of the ridge in the

² See Fig. 1 of the second article, *Methods of ploughing without ridges*, in *Agricultural Gazette*, April 1919.

first passage from zone II to zone III and from zone IV to zone V.

Figure 13 represents a variant, drawn schematically like the previous ones and limited to solution A.

Solution B (Fig. 14).—Here also there are two minimum turns in the passage from zones II to III and IV to V.

As is shown in Fig. 14 the zones follow in the same order as the solution A (Fig. 12).

Thus, after the first furrow to the right of *AB* and the second to the left of *FE* are opened, when the machine is at *E*, instead of returning to zone I, it moves to zone III, to the right of *GH*, then from *II* to zone IV, to the left of *DC*, and so on until the cycle to the right of *HG* is finished. When at *G*, the machine returns to zone I (as shown by the dotted line *mon*) and begins the second cycle at *n* and so on until the work is finished

CASE II: Ridges from 49 to 82 feet wide.

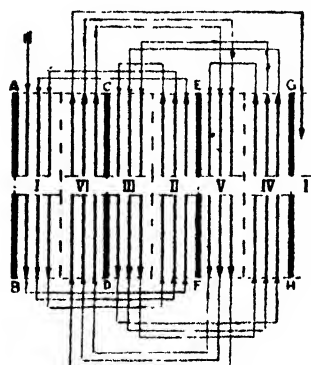


Fig. 12—Solution A.

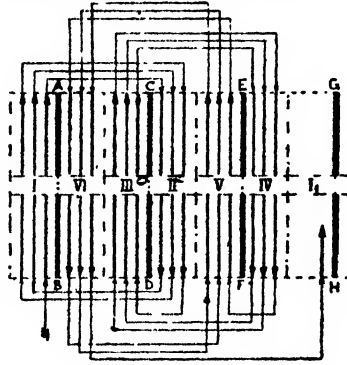


Fig. 14—Solution B.



Fig. 13—Variant of Solution A.

This is why, in the following cases we have suppressed the graphic representation of solution B for the sake of brevity and we only indicate, by the dotted arrow, the beginning of ploughing.

at *p* and the machine passes to the four following ridges. In Fig. 16 a variant of the usual procedure is shown.

Case IV.—Ridges less than 19 ft. 6 in. wide (at least six are necessary). The same lettering

CASE III: Ridges from 20 to 40 feet wide.

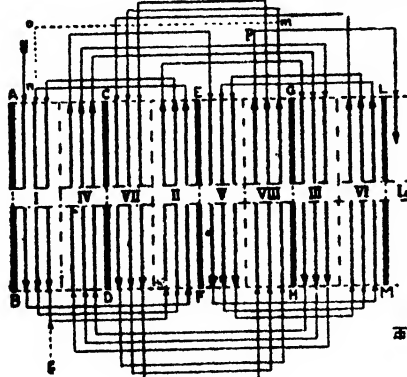


Fig. 15—Solution A.

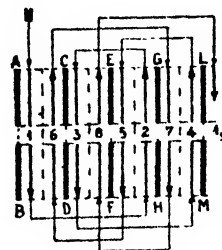


Fig. 16—Variant of Solution A.

Case III.—Ridges from 20 to 49 feet wide (at least four are necessary).—**Solution A** (Fig. 15). The minimum turns correspond to the width of a ridge; consequently, instead of first ploughing zones I and II completely, then zones III and IV, etc., as is shown in Fig. 15, the machine can pass immediately, when each furrow is finished, from one ridge to another and finish the cycle of the four ridges furrow by furrow instead of zone by zone.

is employed as in the previous case, but here the minimum turn includes the width of about two ridges.

Solution A (Fig. 17) with a variant (Fig. 18).

With all the preceding solutions the field can be completely ploughed, provided (independently, of course, of the side and top headlands) that the field is divided into such a number of ridges as to form a multiple of

CASE IV: Ridges less than 19 ft. 6 in. wide.

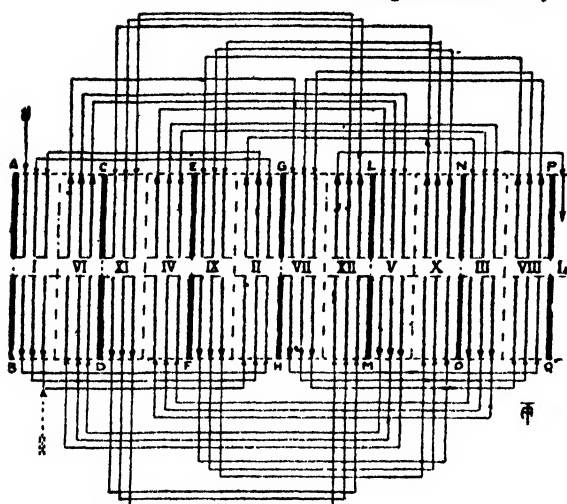


Fig. 17—Solution 4

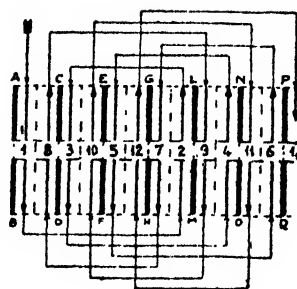


Fig. 18 Variant of Solution 4

the minimum number possible to complete each *cycle* of operations. Thus, in Case I, the ridges should be even numbers; in Case II 3, 6, or 9, etc.; in Case III, 4, 8 or 12, etc.; in Case IV, 6, 12, or 18, etc.

admitted that all these solutions are rather complicated and require much attention from the driver, if not even numbers placed on the ridges to avoid doubt or errors in turning. This is why, in the United States,

Simplified method of continuous ploughing in ridges advised in the United States.

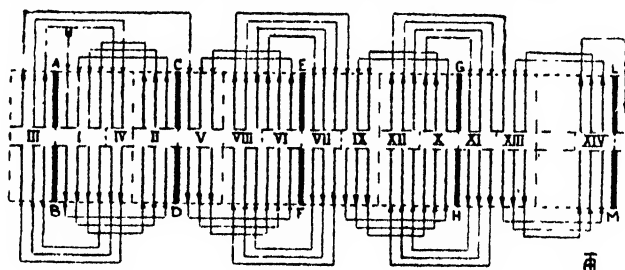


Fig. 19.—Solution B of Case 1.

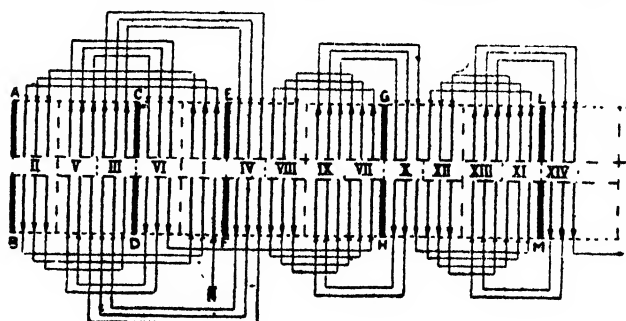


Fig. 20.—Solution 4 of Case 1, obtained by applying that method.

But although the latitude allowed for the width of the ridge usually allows the field to be subdivided as required, it is not always either possible or desirable to do so. On the other hand it must be

where the fields are extremely large, and where the uniformity of the ridges is only of secondary importance, more simple methods are advised which might be called the system of *continuous* ploughing as the

cycle is shortened and instead of closing, continues indefinitely.

One of these procedures, given in "*Farm Power*" (published by the INTERNATIONAL HARVESTER COMPANY, Chicago, 1915) and

ones; which might prove disadvantageous for certain crops. In any case we submit the variants shown in Figs. 21 and 22, in which the unequal ridges are deduced to one only.

Variants of the continuous method proposed by the author.

Fig. 21 -- Solution B of Case 1 (see Fig. 19).

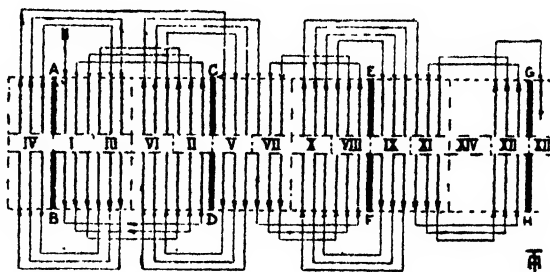
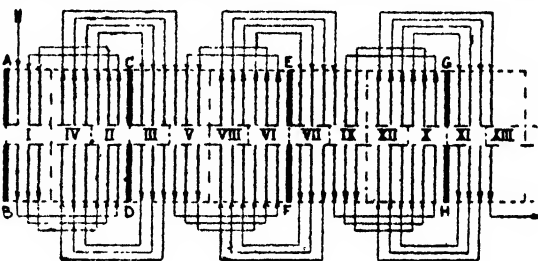


Fig. 22 -- Solution A of Case 1 (see Fig. 20).



reproduced in various French periodicals (such as *Le Genie Rural*, 1917, No. 66), can be applied to our Case I (ridges more than 82 ft. wide). It is shown in Fig. 19 which

But, if it was desired to employ the system of continuous ploughing, the method might be simplified still further and applied to all the cases previously considered. In

Simplified continuous method proposed by the author.

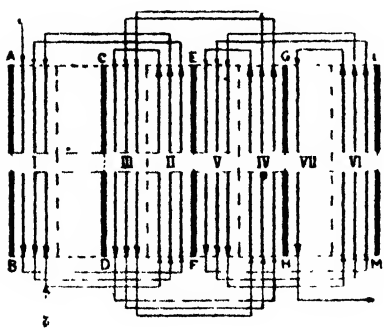


Fig. 23.--Case II: Ridges from 49 to 82 ft. wide.

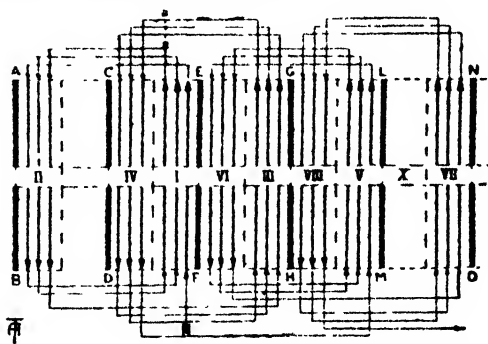


Fig. 24 --Case III: Ridges from 20 to 49 ft. wide.

corresponds to our Solution B of Case I, while Fig. 20 shows the Solution A obtained by applying it.

As is shown in these figures, the first two ridges are narrower than the following

Figs. 23, 24, 25 a few examples of the application to various cases are shown.

The last methods do away with the complicated manoeuvres required with the previous procedures when starting ploughing.

but the idea must be abandoned of ploughing one, or, at a maximum, two zones, both at the beginning and end of ploughing. These zones would then be ploughed separately, either with the machine before commencing continuous ploughing or with a team afterwards. Again they might serve to allow the ploughs to pass to finish the work, thus replacing the side headlands.

an agricultural career or become professors of agriculture, practical schools will be founded on the estates of the National Schools of Agriculture, at Grignon, Montpellier and Rennes. These schools could also be attended by students from the national schools wishing to specialize and by free auditors (see art. 3 of the law). As regards the practical schools, owing to the bad

Simplified continuous method proposed by the author.

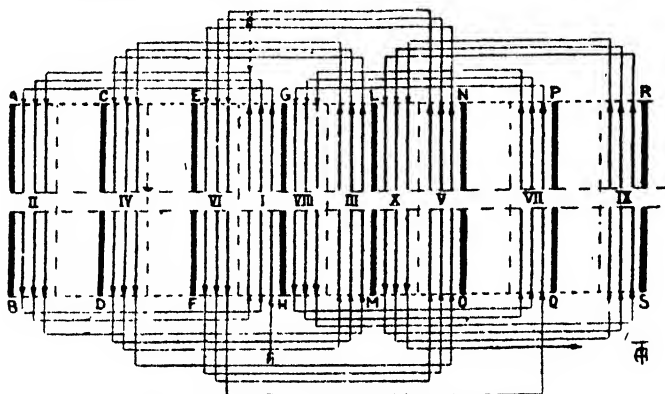


Fig. 25 Case IV: Ridges less than 29 ft wide

GENERAL INFORMATION

1323—Organisation of Public Professional Teaching of Agriculture, in France.—

1. *Feuille d'Informations du Ministre de l'Agriculture*, pp. 1-3. Paris, August 13, 1918.—II.—*Bulletin de la Société des Agriculteurs de France*, pp. 199-200. Paris, August, 1918.

The new French law of August 2, 1918, on the organization of public professional teaching of agriculture in France, is intended, according to M. VIGER, who presented the law to the Senate, to provide agricultural education no longer for 2,000 youths and a few hundred girls, but 1 million youths and 1 million girls.

(1) EDUCATION FOR YOUTHS.—*Agriculture* is taught (art. 1):—(1) at the "Institut national agronomique", which is the normal higher school for agriculture; (2) at the National Schools of Agriculture of Grignon, Montpellier, Rennes; (3) in the schools of agriculture including (a) schools of practical agriculture; (b) the farm schools; (c) the technical schools where some agricultural specialty is taught; (4) in the winter or seasonal schools of agriculture; (5) in the agricultural continuation courses.

Horticulture is taught:—(1) at the National Horticultural School at Versailles, which is the higher school for horticulture; (2) in the schools of horticulture as in section c (technical schools).

In order to give a thorough practical training to the pupils leaving the National Agronomic Institute wishing to take up

results given by the way of running some of them as actual farms on which, the director-farmer, obliged to make the greatest possible profit out of his farm considers the students as labourers, in many cases, rather than real pupils, the law provides that save in exceptional circumstances the farm shall be run either on behalf of a commune, a department, or the State (art. 10).

The really new part of this law is that tending to create and spread everywhere in France the winter or seasonal agricultural schools and public continuation agricultural education.

Art 14—The winter or seasonal agricultural schools are fixed or travelling. They are designed to give, during the bad season, professional instruction to the sons of farmers who cannot spend two to three years in a professional school of agriculture. They are controlled by the Minister for Agriculture.

According to art. 20, continuation agricultural instruction can be given in public schools or in premises placed at the disposal of the State by the communes or private persons. In each commune, the course is started either on request of the municipal council, or on request of the departmental commission provided for in art. 23, and on a favourable report from the general Council. The course, according to art. 22 of the law, is paid for by the department.

(II.) EDUCATION FOR GIRLS.—Art. 26.—Instruction in agriculture and housewifery for girls is given:—

- (1) at the National Agronomic Institute;
- (2) in the National Schools of Agriculture;

(3) in the agricultural housewifery schools, which may be fixed, temporarily fixed or temporarily travelling and which will be known as "*Ecoles agricoles menageres*", "*Ecoles agricoles menageres temporaires*", and "*Ecoles agricoles menageres ambulantes*"; (4) in the course of continuation instruction in agricultural housewifery.

The conditions under which the new law is to be applied will be fixed by the rules of public administration.

CROPS AND CULTIVATION.

1329—The Influence of Rainfall on the Fruit Crop in Norway.—SKARD, A. M., in the *Tidskrift for det Norske Landbruk*, Year XXV, Part 8, pp. 305-332 Christiania, 1918.

Apples and pears can be successfully grown in the following regions of Norway:—North Bergenhus, Jarlsberg and Larvik, Nedenes, Smaalene, Lister and Mandal, Buskerud, Stavanger, Hedemarken, Akershus, Bratsberg, South Bergenhus, Kristians, Romsdal, South and North Trondhjem.

The average crops from 1907-1916 were sufficient for local needs. But there is the serious disadvantage, that the crop varies greatly year by year, thus largely exposing the market to foreign competition. Thus, taking the average crop as 100 we get:—in the Buskerud, 125% in 1909 and 41% in 1916; at Lier, 150% in 1909-11 and only 30% in 1916; in Balestrand, 150% in 1911 and 70% in 1916.

Thus there are years in which the supply exceeds the demand and others when the supply is completely insufficient. To avoid these difficulties, the factors of the variations given above must be known and, given that these variations persist while the conditions of soil and crop remain unchanged, it is obvious that the primary cause of the phenomenon must be sought in the weather conditions.

The author gives the results of a series of researches on the relationship between the yield in fruit and the rainfall. The following localities (centers of production) were studied:—Faaberg, Furnes, Edsvold, Vestre Aker, Rygge and Moss, and Norderhov, all situated in south-eastern Norway (Astlandet).

From the examination of abundant observations it was concluded:—(1) that there is a direct ratio, a positive correlation, between the crop-yield and the rainfall from March to June of the previous year; (2) that there is an inverse ratio, a negative correlation, between the crop-yield and the rainfall of September-October of the previous year. In spring the plant requires a large amount of plastic material so as to satisfy the needs of intense and quick growth:—leafing, flowering, setting, formation of flower buds for the following year. The absorption of material from the soil is subordinated to the presence of water in sufficient amount to dissolve and carry such material.

Insufficient moisture at this moment is fatal to the plant; part of the very young fruit becomes detached on account of lack of food material, and the next year's fruit buds develop badly or incompletely, resulting in a poor spring flowering. From this it will be seen that there is a positive correlation between the fruit crop and the total rainfall from March to June.

During the second half of summer and the beginning of autumn, dry, warm weather is required to mature the spring wood, the fruit, the fruit buds, and the store of reserve materials necessary for recommencing growth in the following spring. When this period is damp and rainy growth continues longer, to the detriment of the reserve material. As a result there is (a) *incomplete maturity of the buds, and wood and also, in consequence decreased resistance to cold*; (b) *an insufficient store of reserve materials and, in consequence, limited and poor flowering in the spring*.

There is, therefore, a negative correlation between the fruit crop and the total rainfall from September to October. Below are given the data for the Faaberg region, the rainfall data being taken from the nearest meteorological station, that at Lillehammer.

Data showing the existence of a ratio between fruit crop and the total rainfall for the periods March-June and September-October (average rainfall: March-June 169 mm; September-October, 125 mm).

Yield		Rainfall		
Years	In per cent of the average	Years	March-June	Sept.-Oct.
	Per cent		mm	mm
1909	150	1908	138	48
1911	130	1910	260	56
1914	120	1913	142	42
1913	115	1912	178	119
1915	80	1914	175	67
1907	40	1906	157	113
1908	25	1907	238	135
1910	20	1909	171	169
1912	30	1911	145	134
1916	20	1915	71	36

There are similar conditions in other localities. A good crop does not always correspond to abundant spring rain or too little summer-autumn rain. The number of flowers does not mean a corresponding number of fruits; the action of late frosts at the moment of flowering and mists during setting may ruin the crop, even though flowering has been most abundant. This explains the variations in the above table. As the north and west are gradually approached, with the increase of the total rainfall during all the year, the ratio existing between the rain and the fruit crop disappears, whilst the action of other factors and weather conditions is plainly shown.

On account of the preponderating action of the rainfall the author gives the following advice to fruit growers in Ostlandet:—

(1) Choose varieties very resistant to drought.

(2) Work the soil deeply so that the plant's roots can grow in length, thus utilising the water stored in the deep layers.

(3) Give the preference, as intercrops, to potatoes, leguminous plants, carrots, etc. These plants have, at any rate in Norway, only a limited growth up to mid-June and thus only remove a limited quantity of water from the soil. During summer, on the contrary, and at the beginning of autumn, the foliage increases rapidly owing to the absorption of large quantities of water, of which the fruit trees are deprived with advantage.

1331—Recent Investigations on Soil Aeration.

—I HALL, A.D., *Phil. Trans.*, B., 204, 1913.

—II HUNTER, C., *Proc. of the Union of Durham Phil. Soc.*, IV, p. 183.—III HOWARD, A., *Agr. Research Institute, Pusa, Bulletin* 61, 1916.—IV RUSSELL, E. J., and APPELYARD, A., *Jour. of Agr. Sc.*, VII, p. 1, 1915.—V HOWARD, A. and HOWARD, G. L. C., *Fruit Experiment Station, Quetta, Bulletin* 4, 1915.—VI

Annual Report of the Imperial Economic Botanist, 1916-17.—VII RUSSELL, E. J. and APPELYARD, A., *J. of Agr. Sc.*, VIII, p. 385, 1917.—VIII *Agr. J. of India*, Science Congress Number, p. 20, 1917.—IX CAN-

NON, W. A. and FREE, E. E., *Journal of Ecology*, V, p. 127, 1917.—X HOLE, R. S., *Ind. For. Mem.*, I, p. 46, 1911.—XI ID.

Indian Forester, p. 343-344, 1916.—XII ID. *Indian Forest Record*, V p. 38, 1914.—

Abstract by HOWARD, A. and HOLE, R. S., Indian Science Congress, Lahore, 1918.

The growth of a crop is only possible through the simultaneous operation of a number of soil factors—water, mineral salts, temperature and oxygen. If any one factor is in defect, or in excess as in the case of temperature, growth is regulated by the amount of this factor present, and is not influenced by an increase in any of the other factors. The chief object in soil management is the removal, in advance, of any possible limiting factor.

The aeration of the soil is a factor in growth which has been neglected in the past. It has

only indirectly been recognised in the importance attached to a proper soil texture. The subject is now attracting more attention and it is proposed to refer to some of the recent work and to indicate the directions in which further investigation is desirable.

AERATION AND THE AMOUNT OF GROWTH.—Various determinations have been made of the amount of growth in cultures in which the only variable factor is the degree of aeration.

(1) *The effect of increased aeration on the root development of barley.*—In water cultures, HALL found that both root development and growth depend on the amount of aeration.

(2) *The effect of soil texture on growth.*—HUNTER found that root development and growth fell off as the soil was more consolidated.

(3) *The effect of adding potsherds or sand to the Pusa soil.*—The addition of inert aerating agents like sand, potsherds or broken bricks to Pusa soil (a fine calcareous silt which readily loses its texture) increases the growth very markedly. In the case of Java indigo, where both nitrogen and oxygen are required, the increase is as high as 40 per cent. To follow the subject further, the structure of the soil must be considered in relation to the root development of the plant. The pore spaces of the soil are taken up by air and water, the latter occurring in thin films round the soil particles. The biological activities of the root hairs and of the soil bacteria involve respiration for which a constant supply of oxygen is necessary and which results in a continuous production of carbon dioxide. Efficient soil ventilation is therefore essential for growth. Recent investigations at Rothamsted on the composition of the soil atmosphere show that the amount of oxygen in the soil falls as the amount of carbon dioxide rises. The water films contain little oxygen but much carbon dioxide that is, the oxygen is used up as rapidly as it is supplied.

VENTILATION OF THE SOIL AND THE SYSTEM OF FLOOD IRRIGATION IN NORTHERN INDIA.—Flood irrigation on fine alluvial soils interferes with their ventilation by rapidly destroying the texture and by forming a compact surface crust impermeable to air. One limiting factor—water—is removed but another—the need of aeration—is introduced. Thus over-irrigation actually diminishes the yield. This is shown by results obtained at Quetta where 13 maunds of wheat were obtained with one irrigation and only 8 maunds where three irrigations were given. In any flood irrigation system, a practical compromise between the needs of the plant for air and for water must be worked out. This has been accomplished at Quetta by the proper utilisation of the preliminary watering given before sowing. Under this new system, the yields obtained are often higher than those obtained with 6 or 7 waterings usually applied. The Quetta results have been shown by experiment to apply to the Punjab and Sind where almost half the irrigation water now used

could be saved. The economic significance of these results becomes apparent when it is remembered that the annual revenue derived from irrigation works in India is £5,000,000.

SOIL, AERATION AND QUALITY.—It is well known that the quality of vegetable products varies with the locality, but the factors on which quality depends are still undetermined. Breed is undoubtedly one of the most important, and no improvement in cultivation can change a short-stapled cotton into a longstapled kind. Various observations suggest that for each variety to attain its highest quality, adequate soil aeration is necessary. A few examples may be given:—

1) *Barley*.—The best malting samples are always grown on open well-aerated soils and never on stiff heavy clays.

2) *Tobacco*.—All the tracts in India which have achieved a reputation for the production of tobacco of good quality are those in which aeration is above the average.

3) *Cotton*.—MR. CLOUSTON'S results on the open laterite soils at Chandkhuri indicate that soil aeration is one of the factors on which the quality of the staple of cotton depends.

Experience in India shows that crops will not mature properly if soil aeration is interfered with during the ripening period. Recent results obtained at Rothamsted show that, on cropped land, ripening is associated with a great outpouring of carbon dioxide into the soil atmosphere. The cause of this is not known. It has been suggested that it is due to the death and decay of the fine roots after the flowering period, but this will not explain the observed delay in ripening if air is not supplied during the period of maturation. An interesting field of research lies ready to hand.

OTHER ASPECTS OF SOIL AERATION.—If soil aeration is a growth factor, aeration must influence the distribution of plants, as of grain in India, and be of importance in ecological studies. CANNON in Arizona and FREE of the John Hopkins University have shown that the poor conditions of soil aeration are correlated with the absence of vegetation in the dry lakes of desert basins, and the zonation of vegetation round these basins may be in correlation with the soil aeration requirements of the plants involved.

The importance of soil aeration in Indian forestry has recently been emphasized by a study of the factors influencing the healthy growth of sal (*Shorea robusta*) seedlings. Whereas water cultures have shown that water in itself is quite harmless, yet water which is held in contact with sal forest soil rapidly becomes highly injurious to the roots of the seedlings. Any factor which increases the amount of moisture in the soil, such as shade or bad drainage, accentuates the injurious action. Rain-water held in contact with such soil is found to become heavily charged with carbon dioxide and impoverished as regards its oxygen supply. In water culture experiments, a high carbon dioxide

and low oxygen-content have been proved to be injurious to the roots. There are good grounds for believing that, in addition to sal, many of the most important Indian trees are very sensitive to soil-aeration, and a careful study of this factor appears to be of primary importance in Indian forestry not only on account of its effect on the establishment and development of seedlings but also because of its probable influence on the growth of older trees and its possible connection with injurious diseases.

1335.—Nitrogen Fixation in Manure.—

I. TOTTINGHAM, W. E., The Increase of Nitrogen in Fermenting Manures, in *The Journal of Biological Chemistry*, Vol. XXIV, No. 3, pp. 221-225. Baltimore, 1916.—II. FULMER, H. L., and FRED, E. B., Nitrogen-Assimilating Organisms in Manure, in the *Journal of Bacteriology*, Vol. II, No. 4, pp. 423-434. Baltimore, 1917.

1336.—The Possibility of Obtaining Nitrogenous Fertilizers by Utilising Waste Materials for the Fixation of Nitrogen by Nitrogen-Fixing Bacteria.—DORYLAND, C. I. T., in *Abstracts of Bacteriology*, Vol. II, No. 1, p. 2. Baltimore, 1918.

1340.—Experiments on the Resistance of Plants to Cold.—PANTANELLI, E. in *Atti della Reale Accademia dei Lincei*, Series V, Vol. XXVII, Pt. 3, pp. 126-130; Pt. 4, pp. 148-153. Rome, 1918 (2 pp. in *Institute Bulletin*).

1341.—The Influence of the Physiological Condition of the Seed upon the Course of Subsequent Growth and upon the Yield; The effects of Soaking Seeds in Water.—KIDD, F., and WEST, C., in *The Annals of Applied Biology*, Vol. V, No. 1, pp. 1-12. Cambridge, July, 1918.

Of late years in most researches dealing with the seed the attention has been almost entirely concentrated upon the question of germination, while little attention has been paid to the eventual influence of treating the grain, which would show how far the physiological condition of the plant in the seed-stage may exert a pre-determining influence upon the whole subsequent course of growth and development. This importance of this question is obvious when it is said that the yield from an equal number of plants of a pure line may vary 50% or even more, owing to the pre-determining influence of the physiological condition of the seed as affected by environmental conditions both before and during germination.

The authors undertook to study this pre-determining influence and, in the present paper, give the first results obtained by immersing the seeds in water at 17° C. for 8, 24, 48 and 72 hours. The seeds used were those of the pea (*Pisum sativum*), dwarf bean (*Phaseolus vulgaris*), barley (*Hordeum*), sunflower (*Helianthus annuus*), white mustard

(*Brassica alba*), broad bean (*Vicia Faba*), white lupin, wheat and oats. The effects observed on the rate of germination of the various samples thus treated, as well as on the yield of the plants obtained (length of stem and root), lead to the conclusion that *soaking the seed in water may have a marked effect on the subsequent growth of the plant.* The nature of the effect is strongly specific, quite different results being obtained by similar treatment upon closely allied plants, as is shown very strikingly by beans. The results of soaking the seeds of the dwarf bean even for 6 hours become evident after a month's growth by a decrease of 26% (as compared with control plants set dry) in the dry weight yield of the tops of the plants. Seeds of the same species, soaked in water for 24 hours before sowing, showed the most rapid and vigorous germination, while later, 12 days after sowing, the total length of these plants as compared with the controls set dry was as 2.4:13.8.

The results obtained with the Broad Bean are quite different: the effect of soaking the seeds was found to be increasingly beneficial, not only on the percentage of germination, but also upon the size of plant produced. Thus, 3 weeks after sowing, the average height of the plants produced from seeds planted dry was only 4 cm. as compared with 10.4 cm. in the case of those soaked for 3 days before sowing.

The photographs accompanying the article show clearly the effect of soaking the seed on the growth of the plants.

1348—Measures taken in Hungary for the Production of Sugar Beet Seed.—*Wochen-schrift des Zentralvereines für die Rubenzucker-Industrie Oesterreichs und Ungarns*, pp. 122-123. Vienna, April 4, 1918. (2 pp. in *Institute Bulletin*.)

1349—Tests of Some Spring Wheats (Manitoba, Aurore and Marquis) in Vaucluse, France.—ZACHAREWICZ, in the *Comptes Rendus des Seances de l'Academie d'Agriculture de France*, pp. 825-828. Paris, October, 1918.

1353—Commercial Pulse Crops.—*Bulletin of the Imperial Institute*, p. 503-544. London, October-December, 1917. (5 pp. in *Institute Bulletin*.)

1362—The Production and Price of Orchil.—*In-en Utvoer*, Year III, No. 40, p. 897. Amsterdam, 1918.

Orchil, a dye extracted from various lichens is used for imparting olive-green and brown shades to feathers, etc., especially ostrich feathers. It is extracted chiefly in the United Kingdom, the lichens being imported from the Cape Verde islands. Of late years the United Kingdom has exported the following amounts to the United States.—1914, 229,068 lb.; 1915, 372,803 lb.; 1916, 512,607 lb.; 1917, 209,383 lb. The increased

exportation of orchil up to 1916 is due to the decrease in that of the German dyes; the increase in price to 6½d. per lb. in 1917 against 3.7d. in 1914 is equally significant.

1365—Effect of Grazing upon Western Yellow-Pine Reproduction in the National Forests of Arizona and New Mexico, U.S.A.—HILL, R. R., in *U. S. Dept. of Agriculture, Bulletin No. 580, Contribution from The Forest Service, Professional Paper*, pp. 27. Washington, D.C., 1917.

LIVE STOCK AND BREEDING.

1370—The Etiological Cause and Treatment of Granular Dermatitis of the Horse.—VAN SAGEGHEM, R., in the *Bulletin de la Societe de Pathologie Exotique*, Vol. XI, No. 7, pp. 575-578. Paris, 1918.

1371—The First Tests of Vaccination against Epizootic Lymphangitis.—BOQUET, A., NEGRE, L., and ROIG, G., in the *Bulletin de la Societe de Pathologie Exotique*, Vol. XI, No. 7, pp. 551-553. Paris, 1918.

1374—The Control of the Blow-Fly and the Sheep Maggot Fly in Queensland.—*Queensland Agricultural Journal*, pp. 136-137. Brisbane, April, 1918.

1379—The Dietary Qualities of Barley.—STEENBOCK, H., KLINT, H. E. and GROSS, E. G. in *The Journal of Biological Chemistry*, Baltimore, July, 1918.

The authors studied the dietary qualities of barley with the help of investigations similar to those used since the work of HOPKINS, OSBORNE and MENDEL, FUNK, and MCCOLLUM, which have already been applied to various foods (1). Rats were used in the experiments. The food (barley, in this case) was first ground to a coarse meal, dried for two hours at 70 to 80°C. and ground to a fine meal to which were added the usual supplements, casein, butter-fat, mineral salts, etc.

CONCLUSIONS.—Barley alone cannot satisfy the requirements of a growing animal, or even allow any noteworthy amount of growth. The addition of the fat-soluble vitamins (given as butter fat) remedies this defect to a certain extent, whereas casein has little effect. The addition of mineral salts gives better results. When all these supplements are added growth is normal. Barley contains the water-soluble vitamins in abundance, but neither sufficient fat-soluble vitamins nor sufficient protein (only 13.6%). Both of these, as well as mineral salts, must, therefore, be added to a ration consisting exclusively of barley, to allow normal growth.

(1). See also *Agricultural Gazette*, July 1918, page 731, No. 2, September 1918, page 919, No. 377, November 1918, page 1101, No. 659 and page 1102, No. 662, and December 1918, page 1187, No. 782.

1382—Crosses between the American Bison, the European Bison and Domestic Cow made in the Zoological Garden of Askania-Nova (Government of Tauride, South Russia).—IVANOV, E. and PHILIPTSCHENKO Jur. in the *Zeitschrift für induktive Abstammungs- und Vererbungslehre*, Vol. 16, Pt. 1-2, pp. 1-48. Leipzig, 1916. (3 pp. in Institute Bulletin).

1387—Fish Meal as a Feed for Swine.—ASHBROOK, F. G., in *U. S. Dept. of Agriculture Bulletin* No. 610, 9 pp. Washington, 1917.

The value of fish meal as a food for swine has been appreciated for many years, especially in Germany. The experiments described in the bulletin were carried out at the Experimental Farm of the U. S. Bureau of Animal Industry, at Beltsville, Maryland, for the purposes of: (1) comparing the value of fish meal and tankage as supplementary feeds; (2) studying the value of fish meal as a supplement to dried potato.

Comparison of Fish Meal and Tankage as Supplementary Feeds.—Twelve Berkshire pigs, of uniform size, about three months old at the beginning of the experiment, were used. The feeding period was divided into two parts: first, a growing period of 112 days from weaning up to fattening age; second, a fattening period of about one month.

During the growing period the pigs were divided into two lots of 8 and 4 respectively. The ration of lot 1 was composed of 4 parts of corn meal, 4 parts middlings and 1 part tankage; that of lot 2, of 4 parts of corn meal, 4 parts middlings and 1 part fish meal. In lot 2 the daily gain per pig (1.31 lb.) was greater than that of lot 1 (1.25 lb.), and, at the end of the experiment there was an average difference in live weight of 10 lbs. in favour of the lot fed with fish meal. The animals in lot 1 consumed, per head, slightly less grain per day than those in lot 2. From observation no difference could be noted between the two lots with respect to growth or general development. This would indicate that one ration was not particularly superior to the other in meeting requirements for growth in pigs.

During the fattening period the same 12 pigs were divided into three lots and fed as follows: lot 3, composed of the same 4 pigs as lot 2 in the growing period, was continued on the same ration, namely, 4 parts corn meal, 4 parts of middlings and 1 part of fish meal; lot 4 composed of 4 pigs from lot 1, was fed a ration of 9 parts of corn meal and 1 part of fish meal; lot 5, composed of the remaining 4 pigs from lot 1, was fed a ration of 9 parts of corn meal and 1 part of tankage. The daily gain per pig was greatest in lot 4 (2.16 lb.), in lot 5 it was 2 lbs. and in lot 3, 1.9 lbs.

Fish Meal as a Supplement to Dried Potato.—Twelve pure bred Berkshire pigs, from 5 to 6 months old, were divided into

4 lots of 3 each, and were given the following rations: lot 1 (check lot) 6 parts corn meal, 1 part tankage; lot 2, 6 parts dried pressed potato, 1 part tankage; lot 3, 6 parts dried pressed potato, 1 part linseed oil meal (old process); lot 4, 6 parts dried pressed potato, 1 part fish meal. The average daily gain per pig was in lot 1 1.57 lb., lot 4, 1.32 lb., lot 3, 0.91 lb. and lot 2, .08 lb. The amount of grain fed per 100 lbs. gain was in lot one, 403 lbs., in lot four, 428 lbs., in lot three, 584 lbs. and in lot two, 695 lbs. Lot 1 excelled all the other lots with respect to rate of gains, amount of feed consumed to produce 100 lb. of gain, and the average final weight. The lot receiving dried pressed potato and fish meal (lot 4) was a very close second to the check lot.

At the close of both these experiments the heaviest hog was selected from each lot and slaughtered on the farm to determine the quality of flesh and fat and the degree of finish. In no case was the meat found to have a fishy odour or taste.

The results of the experiments show that fish meal is a very effective supplement to a grain ration for pigs. When it can be obtained conveniently, and at a reasonable price it should be a popular and remunerative protein supplement for pig feeding.

1389—Final Report of the Fourteenth Egg-Laying Competition Held at the Queensland Agricultural College, Gatton, from April 1, 1917 to March 31, 1918.—*Queensland Agricultural Journal*, Vol. IX, Pt. 6, pp. 213-225 — 10 Figs. Brisbane, June, 1918.

1390—The Artificial Feeding of Bees with Pollen.—USAY, J. in the *Illustrierte Monatsblätter für Bienenzucht*, Year XVIII, No. 5, p. 35. Vienna, 1918.

It is known that in spring bees use a large amount of pollen for feeding the hive. As, in many countries, flowers are rare at this period and the workers are impeded by the bad weather, the author advises the provision of pollen for the bees. This was suggested to him by the fact that many beekeepers spread in front of their hives flour, which is eagerly gathered by the bees. At the flowering season of resinous trees, which produce abundant pollen, the author shook cones over a box cover, thus obtaining an abundant supply of pollen, which he kept in a dry room till the following spring. When this dust is spread on a board in front of the hive in fine weather the bees immediately collect it. The author has observed no ill effects as a result of this food.

FARM ENGINEERING.

1394—The Function of Agricultural Engineers as regards the Makers of Power-Farming Machinery.—COTE, Lieutenant, in *Produire*, No. 5, pp. 158-160, July 5, 1918. (2 pp. in Institute Bulletin).

1396—Restrictions on the Manufacture of Farm Implements in the U.S.A.—*Farm Implement News*, Chicago, July 18 and 25, 1918.

1397—National Power Farming Show at Salina, Kansas, U.S.A.—*Farm Implement News*, pp. 30-48 + 72 Figs. Chicago, August 8, 1918.

The national power farming show was held from July 29 to August 2, 1918, at Salina, Kansas, U.S.A., 48 makers with 232 tractors taking part. The ploughing depth was only 4 inches. Half of the ploughs pulled were 3 bottom ploughs, the remainder having 2 and 4-bottoms. Disc ploughs were shown; it appears that the use of disc ploughs has much increased in Kansas of late.

This demonstration was the first of a national character where official Prouy brake tests were made. The tests began 4 days before the show was opened; the results will not be published, but each maker receives a report covering the tests of his tractor or tractors, and which he can

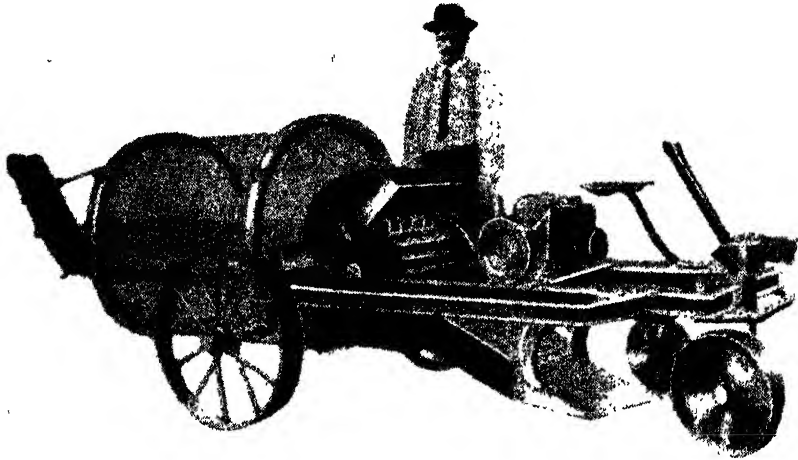
1400—Harvesting with a Tractor.—RINGELMANN, M., in the *Bulletin de la Société d'Encouragement pour l'Industrie Nationale*, pp. 97-101, Paris, July-August, 1918.

1401—Simultaneous Harvesting and Breaking up of the Stubble with a Tractor.—*Le Genie Rural*, Year X (New Series, No. 24), No. 84, pp. 7-8. Paris, 1918.

1273—The "Once-Over" Quack Grass Killer, —*The Implement and Machinery Review*, pp. 415-416, London, August, 1, 1918.

The QUACK GRASS EXTERMINATOR Co., 912, Andrus Building Minneapolis, Minn., U.S.A., makes a new machine for exterminating weeds, particularly couch grass. By running this machine once over a field (whence its name), practically every vestige of crop-killing weed is said to be exterminated.

This new device, shown in the appended figure, resembles a tractor, but does not propel itself. Its petrol motor serves to operate the mechanism while the machine itself is hitched to a tractor or drawn by horses.



"ONCE-OVER" QUACK GRASS KILLER

use as he thinks fit, except that he can not publicly make a comparison between his own figures and those relating to other machines. The Belgian, French, Italian and Peruvian governments sent official representatives to attend the show.

Technical reports will be published later showing the value of the show.

1398—Tests of the Cleveland Tractor at Montpellier, France.—CLARON, C., in *Le Progres Agricole et Viticole*, pp. 150-153 Montpellier, August 18, 1918.

1399—Couplings for Tractors.—RINGELMANN, M., in the *Bulletin de la Société d'Encouragement pour l'Industrie Nationale*, pp. 112-114, Paris, July-August, 1918.

The machine consists of a framework mounted on wheels, carrying at its forward end an ordinary plough, minus the mould board, behind which is a toothed cylinder, followed in the rear by an elevator running backward and upward at an angle of about 40° into separating mechanism, which, in turn, is followed by a large circular sieve moving in an anti-clock direction as the machine travels forward. Inside the reel or sieve is a horizontal conveyor running to a perpendicular elevator swing in the rear of the machine for conveying the weed refuse into a wagon driven alongside.

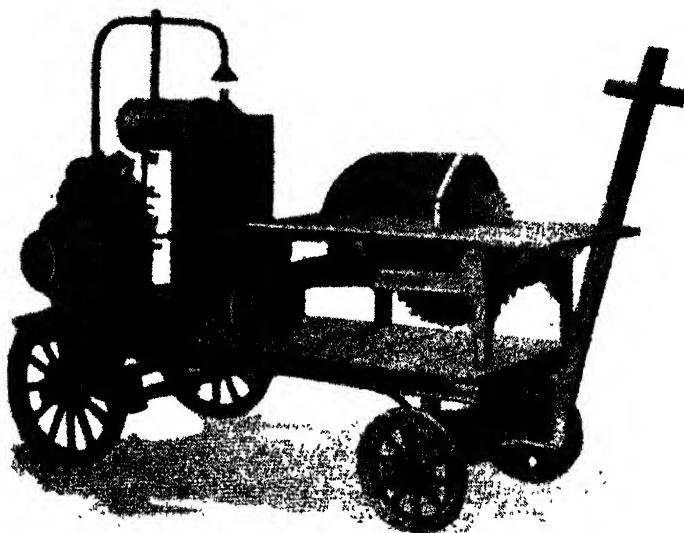
The operation of the machine can be described as follows:—The plough share located at the forward end is 16 in. wide and set to run at a depth of 4 to 6 in.; the

ribbon of soil cut is passed back, there being no mould board, and brought into contact with the teeth of the forward cylinder which cuts and shreds up the weeds and soil. At this point about 60% of the soil is returned to the earth and the weeds, stalks, etc., are elevated into the separating machinery, where a system of separation, not unlike that of a wheat or small grain threshing outfit, separates the weeds and 20% of the soil, the latter being returned to the ground. All the weeds and roots and the remaining 20% of the soil pass into the revolving sieve in the rear. The soil is completely lost through the meshes of this sieve, and the weeds are carried upward by the revolving screen and dumped into the horizontal conveyor, in which they are carried to the perpendicular elevator in

The motor is of the FELIX-MEGEVET type; it is simple, light and runs well. By adding another cylinder, the maker has improved on the old, one-cylinder type. As is shown in the figure in MEGEVET woodsawing plant is completely independent and can be moved and set up anywhere in the forest or at the farm. Its small size enables it to pass easily into restricted spaces. Its easy transport and use gives it a claim for superiority over other systems.

The circular saw, with its roller-table and well protected blade, is very safe and easy to work. The engine drives directly on the shaft of the circular saw by means of a horizontal belt. The whole plant is strongly built and all the parts are easily accessible.

The engine consumes little petrol. By using this motor saw, great economy in



MEGEVET MOTOR-SAW MOUNTED ON A HAND-CART.

the rear, where they are elevated into a vehicle to be carted away and burned, or otherwise destroyed.

A field is thus left in a condition free from all weeds, roots and their noxious growths and in a thoroughly tilled condition, ready to be sown at once if desired. The machine has a capacity of 3 to 5 acres per day, according to the nature of the soil, the thickness of the ground and the speed at which the machine is towed.

This new tool is said to be strongly made and should last from 5 to 8 years; its estimated cost is £200.

1274—Motor-saw Mounted on a Hand-cart. *La Terre Vaudoise*, p. 249. Lausanne, July 6, 1918.

Messrs MEGEVET of Geneva make a circular motor-saw for cutting fire wood; the saw is driven by a petrol motor, the whole being mounted on a small hand-cart.

labour can be made while the work is done more quickly.

AGRICULTURAL INDUSTRIES

1416—The Utilisation of Coal Dust for Heating Greenhouses.—RIVOIRE, P., in the *Revue Horticole*, pp. 157-158. Paris, September 16, 1918.

1418—Free Lactic Acid in Sour Milk.—VAN SLYKE, L. I. and BAKER, J.C., in *The Journal of Biological Chemistry*, pp. 147-178. Baltimore, July, 1918.

1420—The Manufacture of Casein from Buttermilk or Skim Milk.—DAHLBERG, A. O., in the *United States Department of Agriculture Bulletin* No. 661, pp. 32. Washington, April 9, 1918. (3 pp. in *Institute Bulletin*).

1421—The Installation and Equipment of an Egg-Breaking Plant.—JENKINS, M. K., in the *U. S. Department of Agriculture, Bulletin No. 663*, 25 pp. Washington, May 27, 1918. (2 pp. in *Institute Bulletin*).

1422—Microorganisms and Heat Production in Silage Fermentation.—HUNTER, O. W., in the *Journal of Agricultural Research*, pp. 75–83. Washington, July 9, 1917.

AGRICULTURAL ECONOMICS

THE MOSCOW BANK OF POPULAR CREDIT

The Popular Bank of Moscow was founded in consequence of a resolution of the First National Congress of Co-operative Societies, which met at Moscow in 1908. Following the system of the Italian popular banks, the Moscow Bank leans especially on the co-operative societies of credit and thrift, that is to say on the primary organizations.

Federations of co-operative societies may become members of the bank, but, in view of the fact that the primary co-operative organizations must form the principal nucleus of the bank's members, a small co-operative credit society must be taken as the unit of organization, and the district federations of societies are admitted as members merely as representatives of a greater or lesser number of co-operative societies. The federation does not appear as a member of the bank, but the societies of which it is formed are individually members. Individuals may be members of the bank under certain conditions.

The initial capital of the bank was fixed at 1,000,000 roubles (1 rouble at par = 51½ cts.) in 4,000 shares of 250 roubles each.

The liability of individuals admitted to be members is limited to the amount of their paid up shares, but the liability of each co-operative society is an amount equal to ten times its paid up shares. Whatever the amount of a member's shares he cannot have more than one vote, a provision which safeguards the co-operative principle.

The bank may regularly: grant loans for short terms of one year or long terms of five years; open special credits or credit accounts; discount and rediscount bills; undertake purchases and sales on commission; carry forward and lend on security to co-operative societies only. The bank can discount the bills of individuals, only when they are based on the purchase or sale of merchandise negotiated at or by the order of co-operative societies. Individuals, however, are admitted to unlimited participation in the payment of sums intended for the constitution of the banks' circulating funds—deposits, loans, etc.

The net profits of the bank's business are distributed as by the scheme: 20 per cent go to the reserve fund; 10 per cent to the special fund for providing long-term loans to institutions of popular credit; a maximum of 5 per cent to bonuses to the bank's manager and staff, in accordance with a resolution of the general meeting; 5 per cent to a mutual aid fund of the bank's employees in accordance

with a decision of the general meeting. The remaining net profits are distributed, if they do not exceed 8 per cent of the capital in shares, to members as a dividend.

Of the 4,000 shares first named 85 per cent were bought by the co-operative societies and 15 per cent by individuals interested in the co-operative movement. A second issue of shares amounting to 1,000,000 roubles was made in 1914, and a third issue of 2,000,000 in 1916. The last general meeting concerning which there is any information took place in December 1917, and was called to consider the issue of new shares amounting to 25,000,000 roubles.

The bank's deposits reached, on January 1, 1915, 4,000,000 roubles; a year later 10,000,000 roubles; and on September 11, 1916, 22,000,000, roubles or six times the initial sum to which they amounted a year and a half earlier. The annual balance sheet for 1915 amounted to 240,000,000 roubles; and it rapidly increased in the first eight months of 1916, reaching 490,000,000 roubles.

One task of the bank is that of uniting existing co-operative societies in a central organization able to help the bank to collect local capital and distribute it among the co-operative societies interested. The important point is that the money should remain in the possession of the societies and not go to feed the private enterprise of speculators. The funds of the various local co-operative societies should therefore be united at the bank's agency in order that they may be equitably distributed in accordance with local needs. It is only when these needs have been satisfied that the remaining sums pass to the Moscow bank to meet the demand for credit of the other co-operative societies, and thus a constant circulation of credit is maintained. The demand in question varies with districts and seasons. Thus in autumn, when the peasants have no need of money, it is needed by the Siberian dairy societies. In such cases the bank can, by means of its local agencies, direct the stream of necessary credit.

The bank does not limit its business to advancing funds to co-operative societies in need of credit. It has had to extend it and to organize with co-operative societies the purchase of articles necessary to agriculture, and this on a large scale and by the help of its remarkable economic power. The bank for that matter merely follows in

the traces of the co-operative credit societies, which were themselves obliged to go beyond the limits of their initial programme. They were at first intended to furnish capital to their members, but eventually they undertook the purchase of machines, food supplies and other articles. The bank thought itself obliged first to organize as quickly as possible the purchase of primary material for co-operative societies which would otherwise fall into the power of wholesale dealers and the agents of these, exactly as a simple peasant falls into the clutches of the usurer in his time of need.

With this object the bank obtained from the government an authorization to open buying offices which soon had a great success. A buying office is in a better position to know the state of the market, for it uses for this end its connection with the co-operative societies, ascertaining the exact needs of its clientele and finding out the means of satisfying these needs. The elements of information on these points which co-operative societies possess allow a buying office to enter into relations with the most suitable manufacturers. It causes a small sum to be paid to the co-operative societies— from 1 to 3 per cent—for various costs, and a sum which is added to the bank's interest for the fund intended to provide members' dividends. The buying office bought for the farming year 1917 more than 125,000 ploughs, more than 30,000 tons of manure, an enormous quantity of tiles for country dwellings and the most varied articles used by the agricultural population.

Beyond the business of buying on behalf of co-operative societies, the bank's office began to buy the produce of co-operative societies on commission to sell it in Russia and elsewhere. This new branch of its business was not active for long, owing to the war, but in the few months for which it was at work the bank was able to sell in Great Britain about one hundred carloads

of eggs from the region of Pensa and more than 35,000 puds of flax belonging to various producers' societies. This attempt to sell eggs abroad was really successful from a commercial point of view, although the co-operators were competing with egg exporters and had to content themselves with rather low prices. On the other hand, the bank's exportation of flax succeeded in every respect. Within Russia the buying office sold various foodstuffs, as well as terebenthinate and resin, on behalf of the co-operative societies of Archangel.

According to telegraphic information as to the bank received by its London agency, its business was on January 23rd, 1918, pursuing a normal course. The bank's name was not included in the list of banks subjected to nationalization by the State Bank established by the Bolshevik government. It has even gained in importance immensely because it has absorbed the deposits of a number of private banks. Now, at the end of 1918, it is perhaps the most important financial centre of co-operation. Its deposits reach three billion roubles, an enormous sum for an institution formed to encourage the co-operative movement, even if the fall in Russian values be taken into account. It has been spared nationalization because of its economic and moral aim, and is to-day the most powerful and the most accredited financial institution in Russia.

But the disorganization of economic life during this last year of continual revolutions and disturbances has given birth to a series of difficulties which impede the bank's business, especially the lack of a metal reserve and the fall in the value of State paper. At first the State Bank supplied the banks of Moscow with about 10,000,000 roubles a day for their business but this sum has fallen to 400,000 roubles. The bank's business is now limited to deposits and current accounts, for it is not possible, as it was in the past, to open credits for co-operative associations.

CONTENTS OF THE INSTITUTE ECONOMIC BULLETIN

The following is a list of the more important subjects treated in the October 1918 number of the International Review of Agricultural Economics. Persons interested in any of the articles in this list may obtain the original bulletin on application to the Institute Branch, so long as the supply for distribution is not exhausted.

	PAGES.
Co-operation in Japan in 1916	783-788
The Marketing Organization of Creameries in Wisconsin and Minnesota	793-796

Insurance Against Mortality among Live Stock in Switzerland in 1916	797-804
Agricultural Credit and Life Insurance Companies in the United States	805-808
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Agricultural Wages and the Increase in the Cost of Living in Argentina	837-846

AGRICULTURAL STATISTICS

AREAS SOWN TO WINTER CEREALS, 1918-19

Countries	1918-19	1917-18	Per cent (1917-18 = 100)
Wheat—	Acres	Acres	
Alsace-Lorraine	167,000	.....	.....
Denmark	125,000	141,000	88.8
France	11,087,000	11,360,000	97.6
Scotland	69,000	78,000	88.5
Italy	10,502,000	10,793,000	97.3
Canada	840,000	886,000	94.7
United States	49,261,000	42,301,000	116.5
India	23,402,000	33,884,000	69.1
Japan	1,362,000	1,458,000	93.4
Totals (1)	96,648,000	100,901,000	95.8
Rye—			
Alsace-Lorraine	130,000	.....	.....
Denmark	555,000	537,000	103.3
France	1,814,000	1,955,000	92.8
Italy	272,000	271,000	100.0
United States	6,820,000	6,708,000	101.7
Totals (1)	9,461,000	9,471,000	99.9
Barley—			
Alsace-Lorraine	9,000	.....	.....
France	256,000	249,000	102.7
Italy	470,000	495,000	95.0
Japan	2,931,000	2,721,000	107.7
Totals (1)	3,657,000	3,465,000	105.6
Oats—			
Alsace-Lorraine	21,000	.....	.....
France	1,652,000	1,710,000	96.6
Italy	1,112,000	1,185,000	93.8
Totals (1)	2,764,000	2,895,000	95.5

(1) Less Alsace-Lorraine.

UNITED STATES APRIL CROP REPORT

The Crop Reporting Board of the Bureau of Crop Estimates, United States Department of Agriculture, makes the following estimates from reports of its correspondents and agents:—

The average condition of winter wheat on April 1 was 99.8 per cent of a normal, against 78.6 per cent on April 1, 1918, 63.4 on April 1, 1917, and 82.3, the average condition for the past 10 years on April 1. There was an increase in condition from December 1, 1918, to April 1, 1919, of 1.2 points, as compared with an average decline in the past 10 years of 5.9 points between those dates. Upon the assumption of average abandonment of acreage and average influences on the crop

to harvest, condition April 1 forecasts a production of about 837,000,000 bushels, which compares with 558,449,000 bushels, the estimated production in 1918, and 412,901,000 in 1917.

The average condition of rye on April 1 was 90.6 per cent of a normal, against 85.8 on April 1, 1918, 86.0 on April 1, 1917, and 88.6, the average condition for the past 10 years on April 1. The condition of rye forecasts a production of approximately 101,000,000 bushels; last year's estimated production was 89,103,000 bushels; the 1917 crop 62,933,000 and the average of the preceding five years 44,547,000 bushels.

BROOMHALL'S FOREIGN SUMMARY, APRIL 23

Italy.—Crop accounts have been fair, but weather recently has been unseasonable and some complaints have been received of weedy fields. Acreage to wheat is believed to be short, but corn acreage will probably show a fair increase.

North Africa.—Acreage to wheat is short and locusts are threatening in parts. Otherwise conditions generally are satisfactory.

Germany.—Further complaints are being received. Winter sowing claimed to be

small. Spring has been late and sharp frosts have been experienced.

United Kingdom.—Fair progress is being made in ploughing and sowing. The return of excellent weather has permitted of increased activity in agricultural preparations and farm

work is making good progress. Oats and barley sowing rapid.

France.—Weather can be described as brilliant and has favoured crops. Winter wheat is considered fair. Sowings of spring crops continue to proceed rapidly. Coarse grain sowing is making fair progress.

STOCKS OF GRAIN IN CANADA, MARCH 31

Crop	March 31, 1919 (1)	March 31, 1918	March 31, 1917
	Bushels	Bushels	Bushels
Wheat	117,739,000	77,023,328	126,150,137
Oats	164,120,000	155,582,493	184,099,930
Barley	30,542,000	16,042,359	14,871,284
Flaxseed	2,259,000	2,420,328	5,662,274

(1) Figures subject to final revision.

IMPORTS AND EXPORTS OF WHEAT AND FLOUR

(Flour expressed in equivalent quantities of wheat)

Countries	Imports		Exports	
	January 1918	January 1917	January 1918	January 1917
	Bushels	Bushels	Bushels	Bushels
Denmark		54,000	246,000	3,000
Great Britain and Ireland	19,395,000	8,804,000	39,000	46,000
Italy	7,030,000	3,563,000	100,000	7,000
Sweden	357,000		52,000	
Canada		3,000	10,164,000	8,492,000
United States	806,000	7,731,000	22,103,000	37,035,000
Argentina			3,766,000	4,871,000
India			197,000	
Japan	233,000	4,000		355,000
Egypt	144,000	18,000		2,000
Tunis			35,000	3,000

LIVE STOCK STATISTICS

FRANCE

Classification	June 30, 1918	July 1, 1917	Increase (+) or decrease (—)	
			Differences	Percentages (1917 = 100)
Cattle	13,314,856	12,443,304	+ 871,552	+ 7.0
Sheep	9,496,315	10,586,594	— 1,090,279	— 10.3
Pigs	4,020,897	4,200,280	— 179,383	— 4.3

(1) For World's Live Stock, see *Agricultural Gazette*, March, 1919, page 315.

MOROCCO

Classification	May-June, 1918	1916-17	Increase (+) or decrease (-)	
			Differences	Percentages
Horses	119,045	107,573	+ 11,472	+10.7
Asses	337,998	286,123	+ 51,875	+18.1
Mules	46,255	43,235	+ 3,020	- 7.0
Cattle	1,172,891	1,030,045	+ 142,846	+13.9
Sheep	4,194,040	4,289,822	- 95,782	- 2.2
Goats	1,258,327	1,266,383	- 8,056	- 0.6
Pigs	102,745	51,298	+ 51,447	+100.3
Camels	68,285	65,090	+ 3,195	+ 4.9

A GOOD INVESTMENT

Farmers, public officials, and others who have money to invest, would do well to consider the advantages of owning War Savings Stamps. These provide the safest investment that one can get, being backed by all the resources of Canada.

A War Savings Stamp costs but \$4 and a few cents, and it pays 4½% compounded half-yearly, or about 5% simple interest. Thrift Stamps cost but 25 cents each. They may be obtained at any bank, or money order post office. These Stamps make saving easy and they pay well. They are as good as the wheat.

Vol. 6: No. 6



DOMINION OF CANADA
DEPARTMENT OF AGRICULTURE

The Agricultural Gazette of Canada

EDITOR: J. B. SPENCER, B. S. A

Issued by direction of
THE HON. J. A. CALDER
Acting Minister of Agriculture

OTTAWA
J. DE LABROQUERIE TACHÉ
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
1919

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OF CANADA

VOL. VI

JUNE, 1919

No. 6

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THE LIVE STOCK EXPORT TRADE

THE conditions that obtain in Great Britain and other European countries with regard to the need for live stock and live stock products, and the possibilities for Canada of trade in these commodities, were presented by Mr. H. S. Arkell, Live Stock Commissioner, before the Committee on Agriculture and Colonization of the House of Commons and the conference of live stock men held in Ottawa in May. Mr. Arkell dealt with the situation with regard to eggs and poultry, bacon, beef, horses, and sheep.

EGGS AND POULTRY

Prior to the war, the United Kingdom imported forty per cent of its consumption in eggs and thirty per cent of its consumption in poultry, more than half of which came from Russia, Roumania, Galicia, and the Balkan countries. These countries, Mr. Arkell pointed out, have a great shortage of these products and are likely to supply only very limited quantities for a considerable period of years. It is estimated that there are one hundred and eighty odd million fewer fowl on the continent of Europe than there were prior to the war. It was stated that it is the consensus of opinion amongst poultrymen overseas, and amongst those who are studying the trade here, that for a considerable period we should be able to develop the poultry and egg industry which will secure to Canada a financial return that will compare favourably with the return from other lines of live stock.

BACON

The prospects for the continuance of our bacon trade on profitable lines were stated to be good. Denmark, that previous to the war had over two million hogs, has now something less than seven hundred thousand. Her exports to the United Kingdom have been reduced from over two million hundredweight in 1916 to twenty-one thousand hundredweight last year. The same situation is true of Holland. The exportable surplus of these countries is going forward to Central European countries. Owing to the

shortage of feed it is considered scarcely likely that hog production in European countries will reach a normal condition for a considerable time. Irish killings have been reduced to about one quarter of the pre-war output. Mr. Arkell's observations led him to conclude that the safest course to follow would be to develop the trade with the United Kingdom in the special Wiltshire sides, a product which is now in very keen demand and was never before held in such high repute as at present.

CATTLE

Canadian beef must compete with that from Argentina and Australia, where production costs are less than in Canada. The advantage for the Canadian beef trade would seem to lie in a specialized trade in live cattle of lighter weight than South America and Australia supply. The change in labour and family conditions in the Mother Country, owing to the higher wages being paid, will increase the demand for beef of lighter weight than heretofore, at prices that will be profitable to the Canadian producer. There is a demand in all the European countries for cattle. Belgium, France, Roumania, Poland, and Italy require cattle, especially for breeding and feeding purposes. Ireland is not looked upon as likely to be able to provide as many store cattle as formerly. The demand for cattle in Europe, the United States, and possibly in the United Kingdom, is such as to justify the continuance of production at the rate maintained during the period of the war.

HORSES

Two lines of trade in horses are open to the breeders of Canada, first, a permanent trade in heavy horses

with the Mother Country, and, secondly, a trade in horses weighing from one thousand to thirteen hundred pounds with the countries of Central Europe. In Great Britain draught horses are bringing from 150 to 170 guineas each. Roumania, Serbia, and the Balkan countries are now practically without horse power, or even oxen power, in many cases, to cultivate their land. The same is more or less true of Italy, France, and Belgium. These countries would be glad to get classes of horses of which Western Canada has a surplus, the lighter animals which are similar to those for which the Balkan countries are paying from four thousand to five thousand marks each (\$800 to \$1,000).

SHEEP

Sheep feeders, especially in Scotland, are particularly short of stock to finish for market. The supplies from Ireland have been reduced while the demand for mutton was unusually strong owing to the shortage of other meats. These conditions would provide a profitable market for lambs, so many of which are killed in Canada without proper fattening.

After reviewing the trade in live stock products, and in going over the war area where the Canadians fought in 1917 and 1918, Mr. Arkell is firmly of the opinion that the farmers of Canada should organize themselves as the Canadian army did for its special task, with the idea of developing a trade that will make the country prosperous, and enable us to take our place nationally and commercially amongst the nations of the world and on a basis worthy of the services and sacrifices that have been given during the four years of the war.

AMENDMENTS TO DESTRUCTIVE INSECT AND PEST ACT REGULATIONS

FIVE prohibitory amendments to the regulations under the Destructive Insect and Pest Act have recently been made by Order-in-Council. Two of these have reference to the movement of varieties of plants that are associated with the propagation of black stem rust and two with that of white pine blister rust. The latter is dealt with in detail in Part I of this number of The Agricultural Gazette. The fifth is designed to prevent the introduction into Canada of the European corn borer a new and serious foreign pest recently discovered in certain localities of the United States of America and dealt with in the May number of The Agricultural Gazette on page 443. Following is the text of these amending sub-sections:

THE WHITE PINE BLISTER RUST

Section 12 is amended by adding thereto subsection (b) to read as follows:

"(b) The movement of all five-leaved species of the genus *Pinus* and their horticultural varieties, as well as all species and varieties of currants and gooseberries (*Ribes* and *Grossularia*), but not including the fruits of these latter, is prohibited from the area of the Dominion of Canada to the east of the border line between Alberta and Saskatchewan, to the west of this line."

Subsection (f) of Section 7 is rescinded and the following substituted therefor:—

The importation into Canada of the following is prohibited:—

"(f) All species and varieties of currants and gooseberries (*RIBES* and *GROSSULARIA*); provided however, that the importation of such currants and gooseberries shall be permitted from that portion of the United States of America, west of the line of, and excluding the States of Minnesota, Iowa, Missouri, Arkansas and Louisiana, if accompanied by a certificate signed by the duly authorized State official that such currants and gooseberries have been grown within the State from which they are shipped and are free from insect pests and plant diseases. PROVIDED FURTHER THAT THE IMPORTATION OF SAID VEGETATION SHALL BE PERMITTED WITHOUT

ANY RESTRICTION INTO THE PROVINCE OF ONTARIO FROM THE STATE OF NEW YORK.

THE BLACK STEM RUST

Section 12 is amended by adding thereto subsection (a) to read as follows:

"The species, hybrids and horticultural varieties of the genera *Berberis* and *Odostemon* (*Mahonia*) constituting an obstacle to the successful control of stem rust, shall, therefore, be prohibited from being moved from any area outside, to any area within the Provinces of Manitoba, Saskatchewan and Alberta, throughout which provinces they shall be exterminated without any claim for compensation."

Subsection (g) is added to Section 7, which reads as follows:—

"The importation into Canada of the following is prohibited:—

(g) Common or Rust Barberry (*BERBERIS VULGARIS* L.) its hybrids and horticultural varieties; all species and varieties of *BERBERIS* and *ODOSTEMON* (*MAHONIA*) susceptible to Black-stem Rust:—

B. *Amurensis* Rupr. B. *aristata* D.C.,
B. *Canadensis* Pursh, B. *ilicifolia* Forst.,
B. *Lycium* Royle, B. *Nepalensis* Spreng.,
B. *Sibirica* Pall, O. *Aquifolium* Rydb.

THE EUROPEAN CORN BORER

The following quarantine has been added as Subsection (h) of Section 7,

7. The importation into Canada of the following is prohibited:—

"(h) All corn fodder or corn stalks, whether used for packing or otherwise, green sweet corn, roasting ears, corn on the cob or corn cobs from the counties of Essex, Middlesex, Norfolk and Suffolk in the State of Massachusetts, and also from the counties of Schenectady, Saratoga, Montgomery and Albany in the State of New York, two of the United States of America. This prohibition shall not extend to shipments of corn transported through the quarantined areas on a through bill of lading."

The following insect pest is added to Section 18, which contains a list of the destructive insect pests and diseases:

"European Corn Borer, (*Pyrausta nubilalis*, Hubner)".

PART I

Dominion Department of Agriculture

IMPORTANT CHANGES IN THE DEPARTMENT

THREE important changes affecting the Department of Agriculture have recently taken place. The Honourable Mr. Crerar has resigned the portfolio of agriculture. Dr. J. H. Grisdale has been appointed Deputy Minister of Agriculture and Mr. E. S. Archibald has been established in the position of Director of Experimental Farms.

The Honourable Mr. Crerar is succeeded by the Honourable J. A. Calder, Minister of Immigration as the acting Minister of Agriculture. Mr. Crerar was Minister of Agriculture from October 12th, 1917 to June 4th, 1919.

Dr. J. H. Grisdale, has been holding the dual position of Director of Experimental Farms and Acting Deputy Minister of Agriculture since June of last year. He is succeeded as Director of Experimental Farms by Mr. E. S. Archibald who has been acting Director since Dr. Grisdale assumed temporarily the office to which he has now been definitely appointed. Dr. Grisdale's career was recorded in The Agricultural Gazette of July last year.

Mr. Archibald has been associated with the Experimental Farms since 1912, when he was appointed Dominion Animal Husbandman. For the three years immediately previous he

had been Farm Superintendent and Professor of Agriculture at the Nova Scotia, Agricultural College, Truro, and was lecturer in Agriculture during



MR. E. S. ARCHIBALD, B.A., B.S.A., DIRECTOR
OF EXPERIMENTAL FARMS

the previous year. He is a graduate of the Ontario Agricultural College and holds the degree of Bachelor of Arts from Acadia University.

THE EXPERIMENTAL FARMS

DIVISION OF ANIMAL HUSBANDRY

SILAGE CROPS ON EXPERIMENTAL FARMS

BY E. S. ARCHIBALD, B.S.A., DOMINION ANIMAL HUSBANDMAN.

A LARGE variety of various crops for the silo have been tried on Dominion Experimental Farms during the past twenty years and, needless to say, corn has been throughout all these experiments the main crop and the most successful crop wherever corn can be grown with reasonable certainty for this purpose.

It has been found on Dominion Experimental Farms that corn can be used far more universally throughout Canada than formerly judged, providing careful selection is made of proper varieties, and proper cultural methods are used for this crop. However, there are certain areas in Canada where corn cannot be successfully grown excepting in most favourable and exceptional years. In these areas other crops, principally peas and oats; peas, oats, and vetches, and clover have been most successfully used. Reporting briefly on these substitutes for corn, basing conclusions on actual feeding trials and on the broad general experience, the following points are noteworthy.

PEAS, OATS, AND VETCHES

Ensilage made from peas and oats, or peas, oats, and vetches, has been used rather extensively and covering a period of years on several Experimental Farms, outstanding of which are Agassiz, B.C., Lacombe, Alta., Kapuskasing, Ont., Lennoxville, Que., Fredericton, N.B. During the past year new silos were constructed for this very crop and several more silos will be erected in the near future for the same purpose. Experience has shown that this ensilage comes out of the silo slightly darker in colour than corn silage of good quality. However, the colour depends on the stage

of ripeness at which this crop was cut for the silo and the care in thorough tramping. The odour is very similar to that of corn ensilage. Naturally, this material, having a higher percentage of protein than corn, requires greater care in thorough tramping into the silo. Greater care must also be taken to cut at the proper stage of maturity, that is—when the peas are in early blossom and the oats have shot but not turned in colour. If more mature than this it is very difficult to make the best quality of ensilage, even though the material is watered as it is put in the silo. This crop must not be allowed to dry out before ensiling. Occasionally, in putting this crop, or oats alone, in the silo, there have been failures due to insufficient packing, drying out in the field, or similar difficulties. Generally, however, with sufficient care and with slightly greater labour with tramping in the silo, success is insured.

Clover has for many years been successfully ensiled. This, however, is usually an auxiliary measure, either due to a failure of the corn crop, or, more often, due to extremely wet weather during the haying season, thus allowing the saving of a large tonnage of excellent roughage which would otherwise be wasted.

Alfalfa, too, has been ensiled successfully. However, like clover, it is very high protein feed and requires very careful judgment as to maturity, etc., and very thorough packing in the silo in order to make good quality of ensilage.

CORN AND SUNFLOWER

Corn and sunflower ensilage, a mixture commonly grown at Ottawa twenty years ago, was very successful.

Only the sunflower heads were used in this mixture, but the quality of ensilage was outstandingly good. There are no figures to prove that this mixture would be superior to corn ensilage alone as it is grown at the present time from improved varieties of corn. The utility of straight sunflower ensilage in the areas of Canada where corn cannot be successfully grown is under consideration. It is anticipated that trials will be made with this crop during the year 1919 at Experimental Farms at Kapuskasing, Ont., Rosthern, Sask., Scott, Sask., and probably one or two other western farms.

Dr. J. H. Grisdale, when Dominion Agriculturist, tried a large variety of other crops in the silo with greater or less success, but none comparing favourably in economy and efficiency with corn.

During the year 1919 corn for ensilage will be grown on the Experimental Farms at Nappan, N.S., Fredericton, N.B., Lennoxville, Que., Cap Rouge, Que., Ste. Anne de la Poca-

tiere, Que., Ottawa, Ont., Brandon, Man., Morden, Man., Indian Head, Sask., Lacombe, Alta., Agassiz, B.C., and Sidney, B.C. During this year, also, will be grown for ensilage peas and oats, or a mixture of peas, oats, and vetches, at Nappan, N.S., Fredericton, N.B., Lennoxville, Que., Ste. Anne de la Pocietiere, Que., Kapuskasing, Ont., Rosthern, Sask., Scott, Sask., Lacombe, Alta., and Agassiz, B.C.

Clover will probably be ensiled on several of these farms during the coming season, more especially at Lennoxville, Que., and Agassiz, B.C.

Feeding experiments to date have shown that ensilage from peas and oats of proper quality is superior to ensilage from corn as grown at Lacombe, Alta., Agassiz, B.C., and one or two other farms. Clover ensilage when of good quality has throughout all trials proved to be equal to corn ensilage, and in districts where corn is a doubtful crop the clover ensilage is distinctly superior.

DIVISION OF BOTANY

AMENDMENT OF REGULATIONS RELATING TO IMPORTATION AND SHIPMENT OF CURRANTS AND GOOSEBERRIES

THE attention of nursery firms is directed to recent modifications of regulations under the Destructive Insect and Pest Act, governing the importation into Canada of species and varieties of currants and gooseberries from the United States of America, and prohibiting the movement of five-leaved pines and gooseberry and currant vegetation from the area of the Dominion of Canada to the east of the border line between Saskatchewan and Alberta, to the west of this line. The former regulation, subsection "f" of section 7, is amended by order in council dated April 4, 1919, to read:—

"The importation into Canada of the following, is prohibited:

- (f) All species and varieties of currants and gooseberries (*Ribes* and *Grossu-*

laria): provided however, that the importation of such currants and gooseberries shall be permitted from that portion of the United States of America west of the line of and excluding the States of Minnesota, Iowa, Missouri, Arkansas, and Louisiana, if accompanied by a certificate signed by the duly authorized state official that such currants and gooseberries have been grown within the state from which they are shipped and are free from insect pests and plant diseases. *Provided further, that the importation of said vegetation shall be permitted without any restriction into the province of Ontario from the State of New York.*

The italics indicate the modification of above regulation permitting nurserymen and others resident within the province of Ontario to import such vegetation from the State of New York without any restrictions.

This privilege is granted to enable nurserymen to replenish their stocks, and to provide for the propagation of said vegetation. There exists no danger from the introduction of the currant stage of pine blister rust, since the State of New York is equally infected as the areas of Ontario, in which, generally speaking, the nurseries are situated.

Particular attention is directed to the following domestic regulation. Section 12 is amended by adding thereto the following subsection (b):

(b) The movement of all five-leaved species of the genus *Pinus* and their horticultural varieties, as well as all species and varieties of currants and gooseberries (*Ribes* and *Grossularia*) but not including the fruits of these latter, is prohibited from the area of the Dominion of Canada to the east of the border line between Saskatchewan and Alberta, to the west of this line."

The purpose of this regulation is to prevent the introduction of vegetation, by means of which blister rust of pines might be spread, into the Pacific coastal five-leaved pine regions, without interfering with the established nursery trade with Manitoba and Saskatchewan, where five-leaved pines are practically non-existent.

These regulations may well be followed by amendments to the Ontario Destructive Insect and Pest Act, should it be desired to restrict the movement of pines and ribes within the province, to areas as yet regarded free from white pine blister rust; an action which, if taken by the Dominion Government, would make such regulation unclear and cumbersome, with the resulting difficulties at the ports of entry.

In order to make the regulations quite clear, they may be briefly interpreted as follows:—

With the exception of the province of Ontario, which, in addition to the territories referred to below, may import ribes from the State of New York without any restrictions, the importation into the rest of Canada of *Ribes* and *Grossularia* (currants and gooseberries) is prohibited from all countries abroad, but any person in Canada may import, subject to certification as provided under regulations, currants and gooseberries from the states west of the border line formed by the following states of the Union, viz.: Minnesota, Iowa, Missouri, Arkansas and Louisiana—a line running practically north to south and dividing the United States of America into two halves; the eastern half being regarded as the infected area, while the western half is apparently free from the disease.

In Canada, the domestic regulation prohibits the shipment of five-leaved pines, currants, and gooseberries—not including fruits of these latter—into the provinces of Alberta and British Columbia.

In closing it may be of interest to state that recent investigations into the damage caused so far in Canada by the white pine blister rust, have shown—notwithstanding the general conditions, especially in the Niagara peninsula, being quite favourable to the spread of the disease owing to the immense number of wild ribes and cultivated black currants—that the comparatively small amount of pine infections noted may be taken as a hopeful sign that, under favourable conditions, losses from the disease may be kept at such a minimum that the growing of pines on a commercial basis will still be possible. These conclusions, while very promising, should not decrease any efforts directed towards the vigorous control of the disease, wherever possible.

THE ENTOMOLOGICAL BRANCH

WIREWORM CONTROL, WITH SPECIAL REFERENCE TO A METHOD PRACTISED BY JAPANESE GROWERS

BY R. C. TREHERNE, DOMINION ENTOMOLOGICAL LABORATORY, VERNON, B.C.

THE successful control of insects which normally exist for a great part of their life history within the soil, is a most difficult problem. Wireworms are no exception, and for a great many years their successful, economic, and practical control has ranked as a most perplexing situation. A great many measures tending towards their elimination have been suggested and a great many remedies have been tested, but it is realised, even to-day, that the problem still awaits a solution which will meet with the direct approval of farmers. Farmers are prone to expect a satisfactory solution to a wireworm attack through the medium of soil treatments, by arsenicals and gases, and they voice their approval of such methods if results are rapid and apparent to the eye.

This wish on their part is often expressed to cover personal shortcomings, for it must be realised that while some treatments may have their virtues from an economic viewpoint, under certain conditions, the great rule which underlies all remedial measures against soil insects undoubtedly includes the fundamental principles of clean and thorough soil cultivation and crop rotation. Wireworms, in this connection present similar situations to many of our common injurious soil-infesting insects.

To illustrate the great amount of thought that has been given to the subject of wireworm control and to indicate the courses pursued in experimental work, the following references, gathered from European and American literature, are offered as a preliminary statement to some work carried out in British Columbia during the past two years.

(1) *Seed Treatments* with Paris Green; tar; copperas; salt solutions; chloride of lime; kerosene; turpentine; strychnine; and arsenate of lead. None of these were successful.

(2) *Soil Fumigation* with sodium cyanide in lump form sunk eight inches deep in soil and the soil packed above; pulverized sodium cyanide mixed with dry soil as a distributor and carrier ($\frac{1}{2}$ oz. 1 qt. dry soil); sodium cyanide worked into the soil at the rate of 300-500 lbs. per acre; gas lime at four tons per acre; naphthalene 2 oz. to the square yard, well worked in and drenched with water; 1 per cent solution of borax.

These methods have their virtues, though they may be expensive. The cyanide treatment will destroy the wireworms, apparently, with no injury to the soil but it cannot be practised while crops are growing, nor prior to seeding.

(3) *Soil Treatments* with nitrate of soda at 1 cwt. per acre; manurial insecticides; dressings of lime, gas lime, and salt; systems of land flooding. Undoubtedly applications of manurial insecticides assist plants to outgrow wireworm attack, but it has been shown that an application of nitrate of soda at the rate of 16 cwt. per acre proved ineffective as an insecticide. In the same way dressings of lime, salt, etc., have little effect. As to flooding, it has been shown experimentally that wireworms live for a great length of time in cold water.

(4) *Soil Handling* by deep autumn ploughing; spring ploughing; rolling land; thorough cultivation; crop rotations; fallowing; trenching to prevent migration.

Autumn ploughing as a control measure by itself is shown to be of little avail but as a principal of agriculture is strongly recommended. The same may apply to other methods of cultivation.

Legumes are recommended in rotation with hoed crops. Larval starvation methods have failed for the reason that wireworms may live for 18 months in soil devoid of growing vegetation.

(5) *Trapping* adults with baits of green clover or cornmeal dough, sweetened with sugar, and dipped in Paris green; straw traps for adults in spring using three piles to the acre; poison bran mash around field; green alfalfa treated with strychnine.

(6) *Baiting* for larvæ by using sound potatoes cut on one surface and sunk in soil with a piece of cloth threaded through them or pierced with a piece of wire whitened at one end; turnips, carrots, beets, rape cake soaked in arsenate of lead or Paris green; poison baits with strychnine, mercury bichloride, carbide, nicotine extracts and arsenicals. The methods of baiting against larvæ and adults appear to be more or less accepted as principles of wireworm control, although, against larvæ, in particular, results with any poisons were entirely unsatisfactory.

We thus see that a wide range of suggestions have been acted on with somewhat inconclusive results. It is to be regretted that the writer is unable to advance the cause against wireworms very materially but, inasmuch as certain experiments, old in principle but apparently new in method to this continent, have been conducted during the past two years, their rendering may add one item more to the long list of attempted remedial measures.

CONTROL MEASURE USED BY JAPANESE IN BRITISH COLUMBIA

Wireworm injury to such crops as corn, potatoes, and onions, has been the cause of frequent inquiry by the farmers of British Columbia during the past few years. Remedies, embodied in the foregoing resume of generally accepted suggestions, were submitted to the growers but, as a rule, they failed to find complete acceptance. The onion crop in certain parts of the Okanagan Valley, B.C. in particular, has suffered very severely, the attack being localized in certain low-lying areas. The onion growing industry in some sections is very largely in the hands of the Japanese, on the basis of freehold, lease, or partnership. It was a matter of considerable interest, therefore, to observe the methods employed by the Japanese to combat wireworms on their own plantations.

The method consisted of baits composed of rice shorts or rice bran and water, sunk in the soil. During the spring of 1917 my attention was

first attracted to this method and, judging by the results attained in the field, it was apparent that the method was worthy of further trial and experimentation.

METHOD OF APPLICATION

Rice shorts or rice bran is taken and roasted dry in pans or on sheets of tin over a fire. As it browns it is turned frequently. The shorts, thus treated, give forth a pronounced odour which is held by the Japanese to be the cause of attracting wireworms in the soil. The roasted shorts is then moistened by a little water and moulded by hand into small compact balls. The process of setting the baits in the soil is usually carried out by two men; one going ahead with a hoe gouging shallow holes about ten feet apart between the rows of onions, the other following with a sack or bucket containing the bait, throwing one ball into each hole and kicking the soil over it with his foot. Frequently small twigs are inserted as indicators where the baits are placed.

In about a week or ten days the baits are scratched up, broken open, and the wireworms found therein are removed by hand and placed in small collecting boxes. The baits are then re-moulded and re-set, to be examined in the same manner a week or ten days later.

FIELD TRIALS IN 1918

Cost of application.—In May and June, 1917, preliminary tests were made, but these were unsuccessful owing to the fact that it was afterwards found that the baits should have been set out in early spring. On April 24, 1918, onions in the Kelowna district of British Columbia were just showing through the soil, and in several plantations which were being handled by the Japanese it was noticed that the rice ball baits were being set. Arrangements were immediately made to apply 200 lbs. of rice-shorts under supervision. It was found that ap-

proximately 4 acres were treated with this amount.

The summarized cost per acre was as follows:—

Rice shorts.....	\$ 1.00
Preparation.....	1.50
Examination.....	12.00
Total	\$14.50

This cost would not be at all excessive if the process were effective.

Results.—On May 2, 1918, at a time when the onions were about one inch high above ground, a record of the capture of wireworms was made from baits set on April 25. The following table shows the actual records taken from land under onion crop, which had been baited the year previous by the Japanese themselves, wherein it was reported a large number of wireworms had been captured, in comparison with the records on land which had never been previously baited.

ONION LAND PREVIOUSLY BAITED 1918		
BAITS examined	WIREWORMS captured	AVERAGE per bait
Block 1—832	1,605	1 9
Block 2—120	465	3 9
ONION LAND NOT BEFORE BAITED		
Block 3—321	6,492	20 2
Block 4—204	4,617	22.6

These results indicate that the system of baiting for wireworms has its virtues. The numbers of wire-

worms, apparently, had been considerably reduced, although having no actual records of the year previous, absolute conclusions cannot be drawn.

The results of baiting in the remainder of the plantation, which had never been treated before, on examination of 5,755 rice-shorts baits, yielded 24,869 wireworms. The average, as may be seen, was not very high, but considering the acreage, the results were satisfactory.

It can be readily imagined that the degree of infestation is liable to vary inside an acre. This variability was easily discernible in onion plantations where it was observed that in one area complete devastation resulted, whereas, in another area, immediately adjoining, little injury was present. No doubt this was due to the presence or absence of wireworms. In the early spring season it was impossible to treat only the heavily infested areas, as there was no easy way to determine such areas. The whole field would need to be treated, or none at all. Hence the above average is rendered low.

Individual baits, which had only been set one week in the soil, yielded from 0 to 67 wireworms. No more than 67 wire worms were taken from a single bait at one time during the spring of 1918. The bait that yielded this amount, being re-set, captured an additional number of wireworms on the second examination. The area evidently was heavily infested, as the second examination yielded from 5–23 wireworms. Hence it may be seen that a single bait may, under exceptional circumstances, capture as many as 90 wireworms.

The statement of the Japanese growers, therefore, that, in some instances over 100 wireworms may be taken in a single bait is within the bounds of possibility.

HEALTH OF ANIMALS BRANCH

CATTLE MANGE IN THE WEST

BY F. TORRANCE, B.A., D.V.S., VETERINARY DIRECTOR GENERAL.

CATTLE mange has been known in Southern Alberta for many years and it was found necessary to place restrictions over a part of Southern Alberta and South-western Saskatchewan, in order to control the disease and prevent it from extending to other parts of the Northwest. This enclosed district is known as the "mange area," and for many years it has been illegal to ship cattle out of this mange area without complying with certain regulations designed to minimize the possibility of the disease being carried elsewhere.

The herds within the area are under more or less constant supervision, and where the disease is found to exist, or its existence is suspected, cattle are dipped in a regulation mixture of lime and sulphur. Two dippings in this solution at intervals of ten days is effectual in curing the disease, provided the solution is kept at a proper temperature and the cattle remain in it a sufficient length of time. Theoretically it should, therefore, be possible, by dipping all the cattle within the area, to entirely eradicate the disease within a short time. As a matter of practice, however, it is found impossible to make sure of dipping all the cattle.

Anyone familiar with that country, its vast rolling plains, its deep coulees, its rugged country extending up into the foot-hills, and its large areas of unenclosed lands, will realize how difficult it is to collect all the cattle in these unenclosed ranches. No matter how carefully a roundup is conducted, one is never sure that stray animals have not been left in some bunches of scrub or hidden depression. The animals which in this way escape dipping carry over the disease and re-infect the herd when they join it, as they are sure to do after the dipping

is over. The ranch country, however, is gradually being invaded more and more by settlers, the large ranches are being cut up into smaller holdings, fences are being erected over portions of the unenclosed lands, and with the subdivision of these lands the eradication of mange will become easier.

There is nothing in the present situation to cause alarm. Reports from inspectors in the mange area indicate that with a vigorous enforcement of the dipping regulations during the coming season, a large part of the mange will be eradicated.

Conditions within the mange area are now so far improved that a large territory on the western portion is practically free from infection. On the northern part of the area a similar condition exists, the disease there being confined to two or three herds which have been dipped and are held under strict quarantine. These portions will shortly be released from the mange area, thus setting free two hundred and sixteen townships, or upwards of eight thousand square miles, previously held under the mange regulations.

This indicates the progress made in dealing with the disease and will encourage stock owners within the area to hope that the boundaries can gradually be contracted until the infection is finally eradicated.

The department is also taking steps to have all stocker cattle passing through the public stock yards at Calgary properly dipped before returning to the farm. This will remove one cause of the dissemination of the disease within the area.

The number of inspectors engaged in control work has been increased, and there is every hope that satisfactory progress towards the eradication of the disease will be made.

DAIRY AND COLD STORAGE BRANCH

THE 'CHEESE COMMISSION' AND THE 'DAIRY PRODUCE COMMISSION'.

BY J. A. RUDDICK, DAIRY AND COLD STORAGE COMMISSIONER.

THE British Ministry of Food having finally decided that the purchase and export of Canadian cheese for the season of 1919 will be left to private enterprise, the Dairy Produce Commission will automatically go out of business.

A statement as to the activities of this Commission and its predecessor, The Cheese Commission, 1917, may not be without interest. The Cheese Commission was set up at the suggestion of the British Board of Trade, who sent out as their representative Mr. James McGowan of London, England. The Minister of Agriculture was asked to appoint two representatives in Canada, and he named James Alexander of Montreal, one of the leading exporters of dairy produce, and the writer.

In the spring of 1918 the control of the cheese imports passed to the

British Ministry of Food, who had at that time a branch office in New York. The Ministry of Food suggested an enlargement of the commission in order to cover all kinds of dairy produce, and Mr. A. J. Mills, then attached to the Ministry of Food in New York, was named as the Ministry's representative on the Dairy Produce Commission. Dr. James W. Robertson was appointed to represent the Canada Food Board, James Alexander, and the writer were re-appointed, and James Donaldson, President of the Dairymen's Association of Western Ontario, and A. Gerin of Coaticooke, were appointed to represent the producers.

The following statement shows the quantity of each product purchased, with the value of each for the seasons of 1917 and 1918.

	1917-18.		1918-19.	
	Quantities.	Values.	Quantities.	Values.
Cheese (lbs.)	157,603,281	\$34,275,497	148,795,362	\$34,756,950
Butter (lbs.)			9,780,252	4,586,194
Cond. milk (cases*)			582,116	3,810,711
Eggs (cases*)			17,621	268,134
Totals		\$34,275,497		\$43,421,989

Values for 1917-18. \$34,275,497

Values for 1918-19 43,421,989

Total. \$77,697,486

*48 tins of 14 oz.

*30 doz.

All the commissioners served without any remuneration and the total cost of the commission, including office rent, furniture, salaries of in-

spectors and book-keepers, amounted to \$20,680.13 in 1917, or a fraction less than one-sixteenth of one per cent. In 1918 the total expenses

were \$25,554, or one-seventeenth of one per cent. A sum equal to one-third of the expenses in 1918 was collected from the milk condensing companies for short weights in the condensed milk purchased.

The administrative work of the commission has been performed almost entirely by Mr. James Alexander. Mr. Alexander deserves the very special thanks of the country for the devoted and unselfish service which he has rendered in this connec-

tion. For two years he has spent practically every working day in the office of the commission to the neglect of his own business. Mr. Alexander was always on hand to answer inquiries and to attend to the work which the commission had in hand. No doubt Mr. Alexander's close application, his uniform courtesy, and knowledge of the trade was a very important factor in the smooth running which has characterized the operations of these commissions.

DAIRY PRODUCE MARKET REPORTS.

BY J. A. RUDDICK, DAIRY AND COLD STORAGE COMMISSIONER

THE Minister of Agriculture has authorized this Branch to inaugurate a dairy produce market report.

As a beginning the service will cover butter and cheese only. The prices quoted will be those paid by exporters or wholesale dealers for butter and cheese delivered at Montreal, Toronto, or other markets, as specified.

Night lettergrams will be sent out every Friday and Monday evening to representatives of various associations and organizations throughout the Dominion for distribution to the local press and to factory salesmen and others interested. Arrangements are so far completed for the telegraphic reports to be sent to the following: E. T. Love, Sec'y Alberta Dairymen's Assoc., Edmonton, Alta., P. E. Reed, Sec'y Saskatchewan Dairymen's Assoc., Regina, Sask., L. A. Gibson, Sec'y Manitoba Dairymen's Assoc., Winnipeg, Man., Frank Hearn, Sec'y Western Ontario Dairymen's Assoc., London, Ont., H. W. Coleman, Sec'y New Brunswick Dairymen's Assoc., Sussex, N.B., W. A. MacKay, Sec'y Nova Scotia Dairymen's Assoc., Truro, N.S. These officials have agreed to circulate the information as promptly as possible. Negotiations are in progress with other officials.

The telegraphic report should be available to inquirers every Saturday and Tuesday morning.

The telegraphic reports will also be sent direct from this office to any cheese or butter board, or to any firm or person who agrees to pay the cost of the telegram. Those who desire the earliest possible information will no doubt take advantage of this direct telegraphic service.

A weekly market letter will be sent regularly, free of charge, to any person or firm who asks to have their name placed on the mailing list. We propose to develop the service with the kind of information which experience proves to be the most useful, and as our facilities are enlarged for the gathering of the data on which the reports will be based. Some attention will be given to weather and other conditions affecting production throughout the Dominion and also to the international situation, bearing on the world's markets. A close watch will be kept on the development and re-establishment of the dairying industry in European countries.

The details of getting out the reports will be in the hands of Mr. W. W. Moore, Chief of the Extension of Markets Division of this Branch. The writer will give some personal attention to the international features of the market letters.

THE FRUIT BRANCH

EXTENSION OF INSPECTION SERVICE.

BY C. W. BAXTER, FRUIT COMMISSIONER.

SINCE 1917 this Branch has endeavoured to aid the commercial vegetable industry in addition to its regular work, which formerly had to do with fruit only. During the past eighteen months particular attention has been given to potatoes and onions and it is possible that this work will be continued, in co-operation with other branches.

In the autumn and winter of 1917-18 optional potato grading rules were introduced by the Canada Food Board, and their use recommended to growers. They provided for two grades, and shippers and growers were compelled, if their potatoes were represented to be No. 1, or No. 2, to grade them in accordance with the definitions of the prescribed standards, which were embodied in Part X of the Inspection and Sale Act and enforced by the Fruit Branch. It was found, however, that some buyers misinterpreted the meaning of these grades and confused them with the "commercial grades" already established by the trade. The result was that misunderstandings between buyer and seller occurred from time to time and resulted in dissatisfaction. It was apparent that complete uniformity of grades could be obtained only by the introduction of compulsory grading and by the thorough enforcement, through inspection service, of whatever legislation might be most desirable.

But before any steps could be taken towards the introduction of compulsory grading laws, (both for potatoes and onions), it was necessary to obtain an expression of opinion from those who would be affected by such regulations. This Branch therefore sent a circular

letter to wholesale dealers, growers' associations, growers, and buyers throughout the country, so far as their names could be obtained, pointing out the possibility of introducing compulsory grading and soliciting suggestions and criticisms. Several hundred replies were received and of these there were less than a dozen which offered any criticism; there was practically a unanimous vote in its favour.

Having obtained this information it is possible that further steps will soon be taken and that representatives from the various provinces will be asked to suggest grade definitions. It is difficult at this time to state what final action will be taken, if any, but it is unquestionable that compulsory grading would place the potato and onion industries of this country in a much more satisfactory condition than they are today, both in the producing districts and in the distribution centres.

The Fruit Branch has also given attention to the matter of enforcing the use of standard weights of potatoes and onions. These are covered by clauses 337 and 338 of the Inspection and Sale Act, Part X. For years these clauses have been in the hands of the Department of Trade and Commerce but lack of an adequate inspection staff has prevented their thorough enforcement. In August, 1918, they were transferred to the Department of Agriculture and since that time it has been part of the duties of all fruit inspectors to see that the weights of potatoes and onions, as well as of certain other staple commodities, are in accordance with government requirements.

In connection with our reports of crop conditions, which are published at frequent intervals throughout

the marketing season, an extension has been made to include potatoes and onions as well as fruits. All vegetable growers and dealers will therefore be able to keep in close

touch with the acreage, yield, prices, etc., of these commodities by applying for the Fruit and Vegetable Crop Report.

THE LIVE STOCK BRANCH

LIVE STOCK COMMISSIONER RETURNS TO ENGLAND

MR. H. S. ARKELL, Live Stock Stock Commissioner, who recently returned from a trip to Europe to study the situation in regard to the needs and condition of the trade in live stock and live stock products in which Canada might participate, has again gone

to England to still further pursue his investigations and to negotiate with representatives of foreign governments and others with a view of facilitating the sale of Canadian horses, cattle, and other live stock and live stock products.

THE CONSTRUCTION, EQUIPMENT, MAINTENANCE, AND OPERATION OF STOCK YARDS

BY ORDER in council of April 29th regulations were prescribed under the Live Stock and Live Stock Products Act for the construction, equipment, operation, and maintenance of public stock yards.

CONSTRUCTION AND EQUIPMENT

Every stock yard shall be constructed and equipped to provide adequate accommodation for the transaction of all business reasonably to be anticipated with convenience, safety, and despatch. No substantial alteration or addition shall be made in or to any stock yard until the approval of the Minister has been obtained.

There shall be provided sufficient platform space, unloading chutes and chute-pens to permit prompt, safe and convenient unloading and loading; reasonable protection for live stock against weather conditions; sufficient windows in all buildings to light the same by day and there shall also be provided artificial light by night; running water for live stock conveniently located in pens and stables; accommodation for all persons having business to transact at the yards; office accommodation at a reasonable rental to commission merchants, dealers, and buyers; weigh scales with a type register beam.

OPERATION AND MAINTENANCE

Live stock shall be promptly unloaded upon arrival at the stock yards by the proprietor, unless the owner or his agent

otherwise directs, and the proprietor shall have control over the same until a signed release is given by the owner or the authorized agent of the owner. When it is necessary to weigh live stock for purpose of freight charges, the same shall be done immediately after unloading. Straight carloads shall be weighed by the carload as unloaded but in the case of mixed cars the difference kinds of stock shall be weighed and yarded separately.

A certificate showing the quantity, out-turn and weight of contents of each car shall be supplied by the proprietor immediately to the railway company to establish what live stock or other goods the proprietor accepts responsibility for. If any other arrangement is made between the shipper of the live stock and the railway company to determine the freight charges, the certificate aforesaid need not include weight.

Live stock shall be handled in such a manner as to prevent injury or bruising.

The proprietor shall take charge for the purchaser of the stock sold, from the time the scale weight of the stock sold is registered on the scale ticket until a signed release is given by the owner or his authorized agent.

The proprietor shall see that no live stock suffers from want of feed or water while in his charge. In the case of live stock to be fed for maintenance only, the proprietor shall supply the amount of feed prescribed by the Live Stock Commissioner.

Live stock delivered at a stock yard for feed and rest on through billing shall be fed and watered with due regard for the last time of feeding and next probable time of feeding.

The proprietor shall keep feed of good quality and supplies on hand at all times.

Charges for feed and supplies for each calendar month shall be determined by adding to the wholesale market price for the preceeding month a percentage plus a fixed charge for handling. The proprietor shall file with the Minister not later than the 10th day of each month a statement of the average wholesale market price of feed and supplies during the preceeding calendar month and a statement of the charges in force during the current month. This statement shall be supported by such documentary or other evidence as the Minister may require.

The sale weigh-scales shall be operated by weighmasters approved by the Minister.

Whenever live stock is sold a scale ticket shall be issued by the weighmaster showing the date, weight, commission merchant, owner, dealer, buyer, number of head, class of stock, and price.

In the case of stock sold by the head the item of weight may be omitted from the scale ticket. In the case of stock sold at off-car weights, the weight given must be verified by filing with the weighmaster the off-car weigh ticket or a certified copy thereof.

Accommodation shall always be given to stock for sale or in transit in preference to stock for storage, and it shall be the duty of the proprietor to see that the stock-yard is not used for the storage of live stock to the disadvantage of stock for sale or in transit.

The proprietor shall insure all live stock in the yard against loss by fire by means of a blanket policy.

Stock yard charges, except for feed and supplies shall be in accordance with the

bylaws as required by section 7 (1) of the statute.

There shall be kept a register of all sales of live stock in such forms as the Minister may from time to time prescribe and the same shall be available for inspection by the public.

There shall be kept a record of all live stock received at a stock yard and the disposition of the same in such form as the Minister may from time to time prescribe, and this record shall be available for inspection by the public.

The proprietor shall load live stock into cars prepared and fitted for transportation of live stock in accordance with written instructions from the owner or authorized agent of the owner, and the charges for the said services shall be paid by such owner, but nothing in this regulation shall prevent the owner or shipper of pure bred stock from preparing and fitting his own cars provided that regular stock yard service is not interfered with thereby.

The proprietor shall not permit the disposition of deads, downers, or cripples in the yard, except under the authority of the Minister, or inspector.

The proprietor shall be responsible for the construction, equipment, operation, and maintenance of the stock yard in accordance with the above regulations and shall be liable on summary conviction to a fine not exceeding one hundred dollars, or to imprisonment for a term not exceeding three months, or to both fine and imprisonment for any breach of the above regulations.

"Proprietor" shall include owner, lessee, occupier, or operator of any stock yard, whether a limited company, partnership, or otherwise.

PUBLICATIONS BRANCH

THE DISTRIBUTION OF PUBLICATIONS.

DURING the past fiscal year the Publications Branch distributed about 3,900,000 copies of publications. Of these 3,750,000 were distributed to the mailing lists and the remainder in response to requests. These publications include reports, bulletins, pamphlets, circulars, leaflets, Seasonable Hints, The Agricultural Gazette, announcement cards, and posters. The reports include those of the Minister, The Agricultural Instruction Act Commissioner, the Experimental Farms, The Health of Animals Branch, The Dominion Dairy Conference, The

Canadian Record of Performance, The Canadian Seed Growers' Association, and Fruit Crop Reports. The bulletins, which involve eleven separate publications, deal with the various branches of the agricultural industry. Eight circulars deal with such subjects as gardening, cow testing, and varieties of grain. As an incentive to agricultural production and the adoption of more profitable methods in farming, seven special circulars and eleven pamphlets were distributed, covering the feeding of live stock, the cultivation of crops, flax growing, and gardening practices. Of thirteen

leaflets covering various subjects eight provided instruction for the protection of crops against insect enemies, while five were devoted to descriptions of weeds, the use of nitrate of soda, the bankers' competition, and other topics.

The following table shows the number of copies distributed during the year to the mailing lists and in answer to requests:—

	Mailing Lists.	Requests.
Reports	36,740	7,975
Bulletins	320,987	29,000
Seasonable Hints.	721,983	5,320
Pamphlets.	558,801	68,260
Circulars	1,261,478	37,880
Leaflets.	472,145	1,500
Announcement and application mail-list cards and posters	293,493	
The Agricultural Gazette	60,369	3,672
	3,725,996	153,607

THE MAILING LISTS.

The mailing lists, which contain about 200,000 English and 51,000 French names, are divided into seven main subject lists and a number of minor lists. The main lists contain the names of persons who desire publications on field crops, live stock, dairying, poultry, gardening, bees, and tobacco. The names with addresses are embossed on metal stencils from which the entire lists, or any number of them, can be addressed without duplication. The lists are under constant revision. About 25,000 new names were added, 35,000 removed, and upwards of 7,500 addresses changed during the year. The minor lists include egg, produce and seed dealers, drovers, banks, school inspectors, agricultural officials, teachers and others, to whom is sent special information from time to time.

The available publications of the department number upwards of 200 titles.

ASSISTANT EDITOR APPOINTED

MR. J. B. MUNRO, B.S.A., has been appointed assistant editor of The Publications Branch. Mr. Munro was born on a farm in Oxford county and for a number of years farmed in New

Ontario near Fort William. He taught school for two years and in 1915 entered the Ontario Agricultural College, of which he is this year a graduate.

If Canada produces this year the same quantity of butter that she produced in 1918, with our army returning and our increased consumption, we shall be about 15,000,000 pounds short of our requirements. I submit that any persons in Canada who believe that the shortage or high price of butter is due to its being laid away in cold storage are mistaken, and the sooner they awake to the true situation the better it will be for all concerned.

Hon. Senator ROBERTSON, Minister of Labour.

PART II

Provincial Departments of Agriculture

SILAGE CROPS OTHER THAN CORN

NOVA SCOTIA

BY J. M. TRUEMAN, B.S.A., PROFESSOR OF AGRICULTURE, NOVA SCOTIA AGRICULTURAL COLLEGE

EXPERIMENTS conducted during the past five years at the Nova Scotia Agricultural College indicate that a mixture of oats, peas, and vetches will produce on an average a larger yield of ensilage than corn. Corn is not suitable to the Nova Scotia climate, as it seldom matures, while oats, peas, and vetches being vigorous growers in this country will produce a larger yield with proper cultural methods. Their composition is superior to corn and their palatability is all that could be desired. The average yield of oats, peas, and vetches for the past five years has been 10.35 tons per acre. The average analyses of oats, peas, and vetches and immature corn grown at Truro are compared below:

a place on Nova Scotia farms. The strongest advantages are the certainty of a good yield in the great majority of seasons and the small amount of labour required to produce such an amount of feed. Unlike corn and roots, oats, peas, and vetches require no cultivation through the summer.

The seed is sown with a grain drill at the rate of three and one-half bushels of mixed seed per acre. The mixture is made up of two and one-half bushels oats, three-quarters bushel field peas and one-third bushel of common vetch, making a total of a little over three and one-half bushels. This should be sown as early as possible on rich land, as a rapid luxuriant growth

	Water.	Ash.	Protein.	Carbo- hydrates.	Fat.
Oats, peas, and vetches	74.76	1.72	2.60	19.96	.91
Corn	81.54	1.24	2.02	14.25	.66

It will be noted that the oats, peas and vetches contains 6.78 per cent more of dry matter and 58 per cent more of protein, i.e. 100 lbs of oats, peas, and vetches contains 6.78 lbs. more dry matter and over one-half lb. more of protein than 100 lb. of corn.

While the oats, peas, and vetches contain more feed in 100 lbs. than the corn, that is not its greatest claim for

is needed. It is not a profitable crop on poor land. The green crop is cut before the oats turn yellow and as they are entering the dough stage. It is put in the silo through a regular silage cutter. It must be put in green and damp and must be well tramped down. The top foot of silage will spoil, as it is exposed to the air, and must be thrown out before feeding in the winter.

It will not spoil while being fed out. Silage made from oats, peas, and vetches takes the same position in the ration as corn silage or turnips. An average cow eating 15 lb. of hay and 6 lb. of grain a day will eat about 30 lb. of oats, peas, and vetch

silage. A good ration for a 1,000 lb. cow giving 25 lb. of milk a day would be 15 lb. hay (mixed) 30 lb. oats, peas, and vetches, 3 lb. wheat bran, 2 lb. wheat middlings and 1 lb. cotton seed meal.

QUEBEC

MACDONALD COLLEGE

BY R. SUMMERBY, B.S.A., PROFESSOR OF CEREAL HUSBANDRY

WHILE the Cereal Husbandry Department of Macdonald College has not had experience in the ensiling of crops, this department has tested for a number of years crops that are recommended

and used for this purpose. The following table shows the combinations of grains that have been grown, together with the rates of seed per acre, and the crop in tons over periods of from three to eight years.

YIELDS OF CROPS USABLE FOR SILAGE PURPOSES

	Rates per acre.	Yields per acre
Early Gothland Oats.	1½ bush.	} 7 744 tons — 4 yrs.
Prussian Blue Peas.... .	1 "	
Early Gothland Oats	1½ "	} 7 38 " — 4 yrs.
Common Vetches	½ "	
Early Gothland Oats.	1½ "	} 9 425 " — yrs.
Hairy Vetch	½ "	
Early Gothland Oats	2 "	} 10 82 " — 3 yrs.
Hairy Vetches	½ "	
Japanese Millet...	25 lbs.	16.29 " — 8 yrs.

We feel that corn is without doubt the crop that is best adapted for ensiling purposes, and much can be done to extend the area over which it can be grown for ensilage by the use of early varieties, and cultural

methods conducive to early maturity. On areas where this is impossible, and where for any reason the corn crop is a partial or a complete failure, use can be made of mixtures similar to the above to good advantage.

BY H. HARTON, B.S.A., PROFESSOR OF ANIMAL HUSBANDRY

UNDER our conditions we regard corn as easily first for silage purposes. We have, to a limited extent, tried alfalfa, rye, and clover, and while we have found it practicable to preserve these crops as silage, we have found it more difficult, and from the standpoint of yield they

do not compare with the corn crop. This year we are planning to try a mixture of peas and oats. At one time we thought it possible that we would be short of corn silage for the summer months and the use of peas and oats in this connection occurred to us as an alternative. We have

reached the time now, however when we know that we shall have ample corn silage available for the summer months, notwithstanding that, we intend to carry through the original

plan partly for the purpose of investigation. Where corn cannot be grown successfully, peas and oats as a basis seem to offer the next best possibility.

OKA AGRICULTURAL INSTITUTE

BY BROTHER ATHANASE, PROFESSOR OF GARDENING

I AM GLAD to be able to supply the following information, regarding crops other than corn for ensilage.

Up to this date, we have tried for ensilage the following fodder crops: peas, Soya beans, common vetch, hairy vetch, clover, alfalfa, and wood vetch. None of those plants, when put separately in the silo, was liked by the cattle as much as when it was mixed with corn. This is doubtless because such leguminous plants contain bitter nutritive elements, which need to be attenuated by the presence of sweet elements, such as are found in corn. Moreover, these legum-

inous plants when mixed with corn, kept in good condition much longer than when they were ensiled alone.

Artichoke stems, mixed with corn, have given good results. Moistened with a little water and slightly packed when being put in the silo, they give a feed of which live stock is fond. Cattle also eat freely a mixture of corn and sunflower heads.

On account of the scarcity and the high cost of labour as well as the greater amount of work that is required for mixing these different fodder crops, corn is the only crop that we intend to grow this year for silo.

ONTARIO

ONTARIO AGRICULTURAL COLLEGE

BY WADE TOOLE, B.S.A., PROFESSOR OF ANIMAL HUSBANDRY

VERY little work has been done at the Ontario Agricultural College with crops other than corn for silage purposes. We do not contemplate growing this year anything but corn for our farm silos because corn does fairly well here and undoubtedly where it gives as good results as it does on the College farm it is the most satisfactory silage crop. We are planting fifty-five acres to silage corn this season. The following varieties are being used in about equal quantities; Golden Glow, Bailey, Leaming, and Large White Cap. We believe that corn will give us a larger tonnage and a more suitable feed than any other crop.

For districts farther north, however, it would seem that some such

crop as oats, peas, and vetches could be used to good advantage.

I have seen clovers ensiled but not with extra good results where used alone. Mixed with corn, the last cutting of alfalfa, or the second cutting of red clover will save fairly well. I have seen sweet clover ensiled alone and while the stock seemed to eat it well it did not appear to give extra good results. It came out very black and did not seem to have the same value as when cured into good hay.

I think this is a good line to get a discussion upon, and I have in mind, if it can be worked out, having some small silos put up at this institution to try out several crops other than corn for silage purposes.

MANITOBA

BY J. H. ELLIS, B.S.A., EXPERIMENTALIST, MANITOBA AGRICULTURAL COLLEGE

FOR the purpose of studying the various classes of crops suitable for silage purposes seven experimental silos were filled in the autumn of 1918 with the following crops:—1 corn, 2 Sudan grass, 3 millet, 4 alfalfa, 5 mixed cereals, and peas in equal quantities, 6 rape, 7 buckwheat.

These crops, with the exception of alfalfa, were sown on May 13th, and cut and ensiled when it was judged

that each crop was at its best for this purpose. The silos were opened on February 3rd, 1919, and samples taken for analysis. The air-dried weight of these samples have been submitted by the Chemistry Department, and as they indicate the succulence of the ensilage they are included in the following table, which shows the date that these crops were cut, and the green weight per acre as delivered to the silo.

Name.	Date Cut.	Date Ensiled	Green Weight per Acre.	Air-dried Wt. of Ens.
Corn	Sept. 11 . . .	Sept. 13 . . .	18 tons 1,560 lbs.	15.90%
Sudan Grass	Sept. 11 . . .	Sept. 13 . . .	5 tons 1,320 lbs.	20.15%
Millet	Sept. 12 . . .	Sept. 13 . . .	15 tons 506 lbs.	20.53%
Alfalfa..	Aug. 8 . . .	Aug. 9 . . .	5 Sec. Cutting	46.69%
Cereals and Peas, equal quantities..	Aug. 2 . . .	Aug. 3 . . .	12 tons 380 lbs.	20.84%
Rape.	Aug. 2 . . .	Aug. 3 . . .	30 tons 280 lbs.	14.06%
Buckwheat . .	Aug. 2 . . .	Aug. 3 . . .	13 tons 1,720 lbs.	18.25%

When the silos were opened on February 3rd, the ensilage was found to be in an excellent state of preservation. To test the palatability of these various kinds of ensilage, they were fed to dairy cows. The Sudan grass was eaten greedily and seemed to "tickle the palate." The cows would eat this in preference to any other food to which they had access.

The alfalfa ensilage was also greedily eaten, the corn cereals and peas, millet and rape were eaten with about equal relish. The buckwheat on the other hand was refused, and was not eaten until other food was withheld. We have not, as yet, tested out the actual feeding value of these foods, so as to make a comparative report, but we hope to submit this at a later date. We submit the following opinions, however, on their apparent value.

Oats and peas, or Sudan grass, seem

to be, at present, the best substitute for corn for ensilage, where corn cannot be grown. These crops can be handled by ordinary farm machinery, and can be cut with a grain binder. The dry matter per acre compares very favourably with corn and the resulting ensilage is of sufficient quality to justify growing them. Millet makes good ensilage, but does not yield sufficiently heavily in a normal season to be profitable. Alfalfa may be ensiled if, owing to wet weather, it is difficult to cure for hay. Ensilage from this crop is rather dry. Buckwheat and rape both make very succulent ensilage, but they are difficult to harvest.

The Chemistry Department of the College has submitted an analysis of the several kinds of ensilage used in the ensilage experiment this season. The report is in the form of a table as follows:—

Kind of Ensilage.	Water.	Ash.	Crude Protein.	Crude Fibre.	Nitrogen Free Ext.	Ether Ext. or Fat.
	%	%	%	%	%	%
Corn.....	85.34	1.34	2.46	3.31	6.97	0.56
Sudan grass.....	70.53	2.24	3.83	9.00	12.91	1.49
Millet.....	80.08	2.28	3.13	4.44	9.09	0.86
Alfalfa.....	55.45	4.71	8.30	9.44	19.90	2.19
Cereals and Peas, equal quantities.....	80.49	1.63	4.02	5.16	7.58	1.02
Rape.....	86.57	2.09	2.87	1.95	5.40	1.12
Buckwheat.....	82.46	2.40	3.71	3.93	6.66	0.84

The analysis of these samples on the air-dried basis is given below:-

—	Water lost on air drying.	Air dry matter.	Mois- ture.	Ash.	Ether Ext.	Crude Prot.	Crude Fibre.	Nitr.
	%	%	%	%	%	%	%	%
Rape.....	85.6	14.2	5.42	14.70	7.92	20.15	13.72	38.06
Mixed*.....	79.1	20.9	6.64	7.80	4.89	19.25	24.70	36.72
Buckwheat.....	81.7	18.3	4.13	13.13	4.58	20.28	21.50	36.38
Alfalfa.....	53.3	46.7	4.61	10.09	4.69	17.78	20.21	42.62
Corn.....	84.8	15.2	3.59	8.81	3.71	16.23	21.79	45.87
Sudan grass.....	69.6	30.4	3.09	7.37	4.93	12.63	29.50	42.48
Millet.....	79.5	20.5	2.84	11.14	4.73	15.27	21.68	44.34

*Mixed (Wheat, oats, barley and peas) in equal parts.

SASKATCHEWAN SUNFLOWER SILAGE

BY JOHN BRACKEN, B.S.A., PROFESSOR OF FIELD HUSBANDRY

THE use of sunflowers for ensilage is a relatively new practice, at least is so far as the stalks of the plant are used for this purpose. To the Montana Experimental Station is due the credit of pointing out the possibilities of sunflowers as a silage crop. Attention was first focused on the possibilities of the crop when in 1915 at the Experiment Station at Bozeman green sunflower stalks cut up with the feed cutter were found to be eaten quite satisfactorily by dairy cows. In the following year, in addition to using some of the crop for soiling purposes, a portion was put in the silo. In the two years following more sunflowers were grown and more accurate tests of its feeding value undertaken. The results of the work at Montana indicate that there is no obstacle in the way of utilizing this coarse fodder crop for silage. Only some preliminary reports of the feeding trials under way are available. These indicate that the sunflower silage compares very favourably with silage made from corn. Reports of the more exhaustive tests now under way will be available in a short time.

At the University of Saskatchewan sunflowers have been grown in a small way during each of the past eight years. A careful record of the yield of the crop has been kept, but no attempt was made to utilize the crop

as a feed until 1918 when a considerable acreage was sown for silage purposes. During the past winter sunflower silage has been fed to cattle with apparently very satisfactory results. No extensive feeding trials have been made, but the cattle ate the silage quite satisfactorily. In a short test of sunflower silage compared with oat silage fed to milking cows, the former produced slightly more milk pound for pound than the oat silage. This test was carried on for a period of only a few days and should not, therefore, be given undue importance. It was observed that the sunflower silage was more laxative than the oat silage. It seemed, therefore, from this test that rather lighter feedings than is common with oat or corn silage should be given.

With regard to the culture of the crop in Saskatchewan our records indicate that sunflowers yield twice as much as corn under the soil and climatic conditions that exist at Saskatoon. The variety we have used is the same as that used by the Montana Experimental Station, namely, the Giant Russian. For silage purposes it may be sown any time during the last ten days of May either in hills or in rows. We have always sown ours in rows, about three feet apart at the rate of approximately fifteen pounds per acre.

No experiments as to the time

of planting or the rate of planting have been conducted. It is quite possible that fifteen pounds per acre is more seed than is necessary. When sown in hills, or under very dry conditions in rows further apart than three feet, as little as five to eight pounds may be found satisfactory. The land should be prepared in the same way as for corn. After the plants are up intertillage is necessary to control weeds and lessen evaporation. Ordinarily the crop should be allowed to grow as late as possible and still escape frost. When the seed is in the milk stage it is considered that the crop is in the best stage for harvesting. The cutting can be done satisfactorily by using the corn harvester. The filling of the silo with

the sunflowers is carried out in exactly the same manner as if corn were used.

Insufficient work has been done to enable one to estimate with any degree of accuracy, the probable value of sunflowers in Western Canadian agriculture. There is, however, no doubt of the ability to yield relatively high as compared with corn; its value as a feed promises much, but more data should be acquired before it can be considered to have safely passed the experimental stage; nothing is known of its effect on the soil, whereas it has been shown time and time again that corn leaves the land in much better condition for a cereal crop than any other crop now used.

ALBERTA

BY JAS. MCCAIG, M.A., EDITOR OF PUBLICATIONS

CORN has been successfully used for ensilage at the Medicine Hat, Claresholm, Sedgewick and Vermilion farms. It is more successful at Medicine Hat, Claresholm and Sedgewick than it is at Vermilion. It is not regarded as a very safe crop at Vermilion, and even at Claresholm, Sedgewick, and Vermilion substitute crops have been used. At the Olds, Stony Plain, and Vermilion farms the other crops used have been oats, and oats and peas. On the heavy lands of Central Alberta five to seven tons of

green oats per acre can be grown for ensilage and it makes good feed, but the oats and peas make rather better ensilage than does the oats alone, and slightly heavier crops of this combination can be grown than of oats alone.

Alfalfa has been used for ensilage at Claresholm and it makes first class feed. Usually when the first cutting of alfalfa is ready in Alberta the rainy season is still on and the crop is somewhat difficult to save, but if it is used for ensilage it can be immediately harvested without loss.

BRITISH COLUMBIA

BY P. A. BOVING, ASSOCIATE PROFESSOR OF AGRONOMY

PROVIDED sufficient water is available for the crop during the growing season corn for ensilage can be grown advantageously in the whole of southern British Columbia, from the coast to the Alberta boundary, except in altitudes exceeding 1,900 feet.

In spite of this fact other plants also are used for ensilage to an increasing extent. Relatively more

red clover is made into ensilage than any other crop, except of course corn. In certain districts, and in certain seasons, the precipitation is particularly heavy at the time of first cutting, and, rather than make a poor quality of hay and spend time and money in curing the clover with more or less success, the farmers prefer to put it into the silo. Mixtures of peas, oats, and vetches, and

oats alone, have been tried with a fair amount of success, and the results from the feeding of these crops has been very satisfactory indeed. The peas, oats, and vetch ensilage as a rule has given quite as good returns, pound for pound, as corn ensilage; the clover ensilage sometimes has been just a shade less effective. The consensus of opinion among farmers and stockmen is that it is rather unimportant whether the one material is used or the other, as long as it makes good ensilage. The quality of the ensilage, not the origin, and the character of its fermentation are the deciding factors.

Alfalfa also has been used for ensilage to some small extent, but the results are not entirely satisfactory, as the alfalfa ensilage, when put up without any admixture of some carbohydrate containing material, does not keep sufficiently long to be of any great importance for winter feeding.

The mixture which we recommend, when advising farmers to grow peas, oats, and vetches ensilage, is one bushel of oats, one bushel of peas, one-half bushel of small horse beans and one-half bushel of vetches per acre. Incidentally it might be stated that the horse bean is not yet so well known in this province as it deserves to be. In some parts of the province, particularly on pine forest upland soil, there is an absolute lack of the pea bacteria. Wherever there is reason to suspect this to be the case we advise inoculation of the soil. Beans and vetches find their respective bacteria practically everywhere.

The yields per acre obtained in the province range between seven to twenty-four tons of corn; six to fourteen tons of peas, oats, and vetches mixture; eight to twenty tons of green clover and grass mixture, and four to twenty tons of alfalfa.

POLICIES FOR FRUIT INDUSTRY

NOVA SCOTIA

BY P. J. SHAW, B.A., PROVINCIAL HORTICULTURIST

THE yield of apples in the province of Nova Scotia for the past nine years has been as follows:—

	bbls.
1910.....	323,009
1911.....	1,734,876
1912.....	993,339
1913.....	650,901
1914.....	980,520
1915.....	613,882
1916.....	681,409
1917.....	744,730
1918.....	608,601

The above figures do not include apples used for home consumption or apples grown in some of the outlying districts of the province. The years 1911 and 1912 were the best in the history of the apple industry of Nova Scotia and 1910 was one of the worst. An average crop for the province would probably be not far from one

million barrels, although a good year might give double that yield.

It will be noticed that there have been some rather poor years since 1912, and for certain sections of the fruit district the yields have been even worse in those years than the figures would indicate, since the crop is not then evenly distributed over the whole area, the low lying districts generally being the ones which suffer most.

The alternation of good years and poor years for fruit has always been the rule wherever the fruit industry has been carried on. This is true of the wild fruits and of nut trees as well. In Nova Scotia there have lately been several rather poor years but these can readily be accounted for by the character of the seasons in those years or immediately preceding.

There is no reason to doubt that when a normal season returns again that the apple crop will be as large as, or larger than before.

There has been no more general neglect of orchards lately than in former years, although some orchardists may have put more effort into the growing of food stuffs in the last two years of the war than previously. Apple prices have been better during the period of the war than for many years before. Apple growers in the fruit district are optimistic over the outlook for the industry and this optimism is reflected in the ready sale for nursery stock this spring.

The provincial Horticultural Division therefore has no *new* policy to advocate with respect to the growing of fruit, but just the same plan of

urging all fruit growers to take the best care possible of their fruit plantations with regard to tillage, fertilizing, pruning, and spraying, and the extension of those plantations where the circumstances and conditions of the owner seem to justify it. If the usual good care is given to the orchards there is no reason to suppose but that when a normal season with respect to weather conditions recurs there will be a good yield of apples.

Nova Scotia has no such destructive pest as the San Jose scale, thanks to the regulations of the provincial government and the efforts of the Provincial and Dominion Entomologists. The other pests which make spraying of orchards necessary are native, or were introduced here many years ago.

NEW BRUNSWICK

BY A. G. TURNEY, B.S.A., PROVINCIAL HORTICULTURIST

THE outlook for profitable apple-growing in this province was never better and, indeed, so far as the opportunities are concerned, it is doubtful if it was ever as promising.

PROFITABLE APPLE-GROWING AN ESTABLISHED FACT

During the past few years the Department of Agriculture has done much to demonstrate that commercial apple-growing in New Brunswick is no longer something about which there is any doubt, but rather, that it is a fact—a natural resource of proved value and capable of large extension. The greater and more general realization of this fact has been accomplished by the holding of three large apple shows in St. John, second only in Eastern Canada in point of size and excellence to the Ontario Horticultural Exhibition; by the prominent displaying of our apples at the various agricultural exhibitions in the province, and also in Montreal, Toronto, Boston, and London; and, lastly, by the conduct-

ing of demonstration orchards and the general educational work of the Fruit Division. These means of publicity in bringing the accomplishments



MR. A. G. TURNEY, B.S.A.

of our fruit growers into very general realization will be continued and new ones, already under consideration, will be put into effect.

DEMONSTRATION ORCHARDS

The policy of conducting demonstration orchards will be continued in a modified, improved, and extended form. Some fine new large orchards which were planted about seven years ago as a direct result of the publicity campaign of this division, and which are now coming into bearing, will receive special attention in the confident expectation that they will inspire the planting of many others. The teachings which they will undoubtedly yield and their relation to the present and future methods of apple-growing, selection and adaptability of varieties, etc., will be carefully and advantageously used.

CONCENTRATION ON CERTAIN VARIETIES

The work of the last few years has established clearly that our leading varieties of apples, those on which the extension of the industry is based, are Wealthy, Alexander, Fameuse, and McIntosh (with McIntosh preferred to Fameuse) there are others that may be profitably grown in particular sections or localities but these four we can grow to perfection—so why ask for anything better? Given these varieties of proved worth and adaptability, the obvious thing to do is to exploit their production in the very best sense of the word—to demonstrate as widely as possible their superiority over other varieties for our conditions, and to ascertain the best and most economical methods of producing them.

To this end the efforts of the Fruit Division will be concentrated and new steps have already been initiated and much important work started. In 1918, the division established nine new test orchards of Fameuse,

McIntosh, and Alexander and this year we will set out eight more new, but larger, orchards of these varieties, including Wealthy, in various combinations and planting distances. These new commercial demonstration orchards, as they will be known, are being placed with leading growers so that the conditions of care and culture may be the best obtainable. Accurate and detailed records as to the cost of growing, etc., will be kept and published, and to a large extent these orchards will be pruned and their care supervised by the Fruit Division.

PROVINCIAL NURSERIES

Previous to 1913 the demand for apple trees of the most suitable varieties for planting in New Brunswick could not be supplied entirely by the local grown stock, and hence the importations from Ontario, Nova Scotia, and the United States. It is gratifying, therefore, to report that, with the active encouragement and support of the Fruit Division, there has since been a comparatively large development of the nursery business, and the present supply of New Brunswick grown trees of the best varieties is fully equal to the demand, and consequently there is no need of sending out of the province for apple trees. The stock in these nurseries has been inspected for the past five years by officials of this division and found to be apparently free from the San Jose scale, and generally in a thrifty and desirable condition.

THE FRUIT GROWERS' ASSOCIATION

A strong and active Fruit Growers' Association is essential to the progress of the industry, and the department has always given a large measure of practical support to it. Largely as a result of this support, the association has been able to make a big increase in its membership, to foster and develop the spirit and practice of co-operation, to purchase for and supply its members with nursery stock, spraying materials, and all

kinds of fruit growers' supplies, and to engage in the co-operative marketing of their fruit. Under the fostering support of the department, the association has developed into an increasingly powerful factor for the extension of our apple industry and one that will always work in co-operation and with the support of the department.

PRUNING ASSISTANCE

Assistance in the pruning of orchards has been a feature of the work of the division for some years, and last year, realizing that shortage of help and other conditions might lead to more than ordinary neglect of orchards, the assistance in pruning was largely increased and many farmers availed themselves of this opportunity and thus kept their orchards in good condition. This policy of providing competent men, at a nominal charge of twenty cents per hour, to instruct, and assist farmers in the proper pruning of their orchards, meets with unanimous approval, is of very considerable value in our present stage of development of apple-growing, and is being continued.

EXPERIMENTAL AND EDUCATIONAL WORK IN SPRAYING

Although orchard spraying is still capable of being much more generally adopted, yet there has been a big improvement during the past five years, both in the methods used and the thoroughness of the work done and the number of orchards being sprayed. Power outfits have been secured by most of the larger growers and the sale of barrel pumps for use in the smaller orchards has increased very rapidly.

In 1917, this division, acting in co-operation with, and under the direction of, Mr. G. E. Sanders of the Dominion Entomological Laboratory, Annapolis, N.S., started a series of spraying experiments with the object of working out a thoroughly practical and efficient system especially adapted to New Brunswick

conditions. Already, this work has been successful beyond our most hopeful expectations, so much so, that we feel that the chief spraying problems of our orchards have been solved, in principle at least, although there may be room for minor improvements, and we are now able to recommend a system of sprays which we know from actual practice, may be relied upon to produce clean fruit even in an unfavourable season. It would be hard to over-estimate the importance of this work in its relation to the development of our apple industry, and its combination and extension is an important part of the policy of this department.

CO-OPERATIVE MARKETING

The greatest incentive to increased orchard plantings is the profitable marketing of our present apple production. Realizing this, the division has paid special attention during the past two years to the co-operative grading, packing, and marketing of what may be termed the exportable part of the crop, and in this work it met with marked success, getting very profitable returns for the apples thus sold outside the province, raising the price on local markets and increasing the general demand for and reputation of New Brunswick apples. The continuance of this practical form of assistance is essential to a well-rounded and mature policy of encouragement.

SUMMARY

The conclusion of the war has not brought about any radical change in the policies of the Fruit Division, for the reason that these changes, together with the continuance of the former policies, were decided on three years ago in anticipation of the very situation which faces us today.

Not only has New Brunswick maintained the pre-war conditions of her orchards throughout the four years of the struggle, but in point of organization and development, the province is in a better position today than in 1914.

ONTARIO

BY P. W. HODGETTS, B.S.A., DIRECTOR, HORTICULTURAL DIVISION

THE scarcity of labour and the need of production, to the utmost limit, of all kinds of grain and stock during the period of the war is responsible for the apple orchards of the province being neglected during the past three years. Orchards were put into sod and both pruning and spraying were largely stopped. The exceptions were in cases of large orchards, the product from which forms the chief source of income to the owner. The aim of the department now is by every means to re-awaken interest in the farm apple orchards from which comes a large proportion of our apple crop. Advertising was first resorted to during the winter months so that growers would have brought to their attention the fact that the prices for good fruit would likely again be high. Advice was given on pruning, spraying, and fertilizing, so that the men would begin to make their plans early in the present season.

Wherever there was any evidence of awakened interest, demonstrations were held this spring and a number of our men were kept busy visiting individual orchardists who had applied for assistance, particularly in reference to pruning. We consider that this latter work is perhaps the best that we can follow and we have always made it a point to send a good practical man to the orchard where he can best give advice on the treatment required.

In co-operation with the Horticul-

tural Division of the Experimental Farms and the Entomological Branch of the Department of Agriculture at Ottawa, we are starting a series of spraying tests to determine the proper seasons and dates for spraying and the value of the various spraying materials. These tests will be conducted in our Norfolk orchard and will be extended for three years. This orchard, along with five others under lease by the department, will be continued as demonstration orchards. Owing to the war, the cultivation of some of these orchards had to be dropped as it was impossible to secure the necessary labour.

Unfavourable weather conditions of the war years so reduced the quantity and affected the quality of Ontario apples that the markets for our fruit have been filled from other sources and Ontario will have to fight again to effect an entry there. It is the purpose of the department to send exhibits again to the west and to advertise in the papers there. Probably a similar effort will have to be made in reference to the British market.

As a result of the efforts put forth along these lines and as a result of the high prices received for the limited quantity exported, already there are abundant evidences of a good outlook for the orchard crop. Much pruning and spraying has already been undertaken and we hope to see a continuance of this until the final spraying is completed.

BRITISH COLUMBIA

BY DAVID WARNOCK, M.R.C.V.S., DEPUTY MINISTER OF AGRICULTURE

BECAUSE of the varied climatic conditions that obtain in different parts of British Columbia, for purposes of assisting the fruit growing industry the province is divided according to major conditions, with an assistant horticulturist in charge of each. The work on Vancou-

ver Island and the Lower Mainland is in charge of Mr. E. W. White. Mr. Ben Hoy directs the activities of the department in the Okanagan district, while the Lower Mainland section is directed by Mr. K. W. Munson under Mr. White's supervision. Mr. J. A. Grant, Prairie

Markets Commissioner, is now on his way to Great Britain to look into the market conditions there and we hope his visit will prove beneficial to the fruit growing industry in British Columbia. The following article prepared by Mr. White represents the work the department is doing on Vancouver Island and Lower Mainland. The work in other sections is similar in character. The office of Chief Horticulturist is vacant and will likely be filled at an early date.

INSPECTION AND HORTICULTURAL INSTRUCTION.

A large proportion of the time especially in the spring months, is taken up with orchard inspection work for pests, and personal visits to growers, giving advice concerning pruning, spraying, and general horticultural questions.

PEAR THRIPS.

Pear thrips showed up very suddenly in 1915, and caused a great deal of damage in the orchards of southern Vancouver Island. In co-operation with the Dominion Entomological Branch extensive work was carried on in 1916 and 1917 studying the life history and methods of control. This work was continued in 1918, and as the pest has again shown up in considerable numbers a good deal of time has been occupied recently making inspections of orchards and giving advice regarding this pest.

STRAWBERRY DEMONSTRATION PLOT.

A six-acre demonstration plot has recently been established on the farm of G. Vantreight, Gordon Head, B.C.

This has been done in order to prove the efficient control of the strawberry root weevil by means of recommendations already made and by a proper system of crop rotation and a building up of depleted strawberry soils.

The above-mentioned pest threatens to ruin the very important strawberry industry on Vancouver Island if the growers do not adopt proper control measures immediately. It is hoped that the demonstration plot will give an added impetus to the growers to change their methods.

ICE-DAMAGED ORCHARDS IN THE FRASER VALLEY.

During the winter of 1917-18 a great deal of damage was done to orchards in the Fraser Valley by a severe ice-storm. Work was undertaken by the department in the spring of 1918 and a large amount of work was done for the growers in pruning and grafting the damaged trees.

This work is being continued this spring, as there were a large number of trees which were not attended to last year.

SMALL FRUIT INDUSTRY.

Everything possible is being done to encourage this industry on Vancouver Island and the lower mainland, as it is felt that this is the branch of horticulture to which the district is most adapted. Encouragement is not being given to any large plantings of tree fruits. Early apples, pears and stone fruits do fairly well, especially pears, but the district is not pre-eminently a tree fruit district.

HASTENING CORN MATURITY

QUEBEC

MACDONALD COLLEGE

BY L. C. RAYMOND, B.S.A., IN CHARGE OF ROOT AND CORN CROP INVESTIGATIONS

CORN is one of the most important fodder crops in Eastern Canada. It is produced both for grain purposes and for ensilage. In both cases the great limiting factor is the maturity—in the one to attain sufficient for germination the following year and in the other to provide the best quality of ensilage. It naturally follows that any practice that will hasten the maturity of the corn crop, even if only by a few days, would be of great value to the Canadian farmer. From various sources it has been suggested that the application of phosphatic fertilizers would accomplish this purpose. In this brief article the writer hopes to bring together the evidence in support of this claim and point out the problem to be worked out in the future, rather than to attempt any conclusive statement on such meagre data as at present obtains.

Unfortunately most of the published records dealing with the effects of phosphates on plant growth deal with crops other than corn. One of our best authorities on that question is undoubtedly Dr. E. J. Russell, Director of the Rothamsted Experiment Station in England. In his book entitled "Soil Conditions and Plant Growth," after showing in a general way that phosphates are particularly valuable in inducing greater root development, he makes the following definite statement:—"Later in the life of the plant phosphates hasten the ripening processes, thus producing the same effect as a deficiency of water, but to a less extent. For this reason they are applied to the wheat crop in some of the northern districts of England to bring on the harvest a few days earlier and obviate the risk of loss

by bad weather. The northern limit of several crops may be in like manner extended. The ripening effect is well shown on the barley plots at Rothamsted, crops receiving phosphates are golden yellow in colour while others are still green." All that one can say by way of comment on the foregoing statement is that it is very suggestive of the possibilities of this type of fertilizer for the Canadian corn crop. An intelligent use of commercial fertilizers may in future direct their use on the corn crop in Canada as they are at present used for wheat in England.

So far as the writer is aware no definite data are available on this question for the American continent, though to say that the effect of phosphates in hastening the maturity of corn was unknown would be to state an untruth. The following statements from prominent American investigators help to throw some light on the issue.

Prof. L. H. Smith, Acting Head of the Agronomy Dept., at Illinois says in part:—"It is a matter of common observation among us at this Station that corn growing on land that has been treated with phosphorus matures more rapidly than on adjoining land not so treated. This was particularly true in the season of 1917 when we had such an unfavourable year for matured corn."

Prof. Geo. E. Corson of the Department of Soils in the Iowa State College states that "The effect of acid phosphate on corn has been noted for several years on our older experimental fields and we are of the opinion that the chief advantage of this fertilizer in Iowa is in its effect on the maturity of our crops."

Prof. R. A. Moore of the Univer-

sity of Wisconsin also gives it as his opinion that phosphates will hasten the growing of the corn crop.

Prof. J. D. Harper of Indiana, who judged at the Ontario Corn Show at Kingsville in February, 1917, in the course of his remarks on corn improvement makes the following statement:—"Phosphate fertilizers have proved to be of considerable value in hastening maturity and most clay and loam soils will respond with profit to applications of acid phosphate."

The foregoing evidence by leading experimentalists, in the heart of the American corn belt, are general rather than specific, but are at the same time deeply significant and warrant study and development by our Canadian stations. It seems a safe conclusion that phosphatic fertilizers will act as a valuable aid in extending the

corn area of Canada. As stated at the outset, one of our greatest drawbacks in corn growing is lack of proper maturity. This is, of course, due in part to the improper selection of the right variety for the locality. However, this in some respects excusable as the grower is after a heavy tonnage, though it can hardly be said that due appreciation is held of properly matured ensilage. Quantity production is a laudable incentive, but where ensilage corn is concerned should be combined with quality. Quality in this case is determined very largely by maturity. Phosphatic fertilizers have a very direct influence on this factor.

It is to be sincerely hoped that this problem will be actively taken up by many of our Canadian investigators and definite data made available for the guidance of the actual grower.

ONTARIO ONTARIO AGRICULTURAL COLLEGE

BY R. HARCOURT, B.S.A., PROFESSOR OF CHEMISTRY

IT is quite generally recognized that phosphatic fertilizers will hasten the maturity of grain crops. The question is now raised, can this function of phosphoric acid be used to hasten the maturity of some of the larger-growing varieties of corn enough to extend their area of growth farther north.

Farmyard manure is very generally used on corn land and as it is essentially a nitrogenous manure it tends to force big leaf and stem growth and retard maturity. The addition of a phosphatic fertilizer would naturally be expected to hasten maturity and will probably do so unless the soil is unduly rich in nitrogen. It must not be forgotten, however, that the character of the season may have even a greater influence than the fertilizer. Rothamsted experiments with barley show that in a wet season the influence of phosphoric acid in hastening maturity may be an advantage; but that in a dry season, when the grain ripens quickly, perhaps too quickly, the presence of phosphoric acid may be detrimental, as it is

hastening what is already taking place too rapidly. There is not the same danger with a crop of corn, as it roots deeper and is not influenced to the same extent by drouth and ripens later in the season when the weather is cooler; consequently there would not be the same danger of curtailing the crop as with barley.

Little data are available showing how much the use of phosphoric acid hastened maturity, that is, where it has been expressed in days. Last year, a dry season, we know of one instance where the use of phosphoric acid on one part of a field of corn brought it to a stage of maturity for cutting for husking fully a week ahead of the balance of the field. To what extent this method may be used to hasten the maturity of large-growing varieties in northern areas, we are not sure; but it would seem probable that in proportion as maturity is hastened, growth will be curtailed and there would be comparatively little return for the risk taken in growing the larger variety.

MANITOBA

BY J. H. ELLIS, EXPERIMENTALIST

I REGRET that our experience in using acid phosphate to determine its effect on maturity of crops has been very limited up to the present, and has consisted of an application to a four year rotation, which has just been completed as follows:—

Year 1, Corn.

Year 2, Wheat.

Year 3, Oats and seed down to Western

Rye and Timothy.

Year 4, Hay.

The effect of super-phosphate applied to the corn in the first year has stimulated the immediate corn crop and the subsequent crops of wheat and oats. We have failed to notice any beneficial effect from the super-phosphate in giving early maturity.

We have now laid down a more extensive project on the use of commercial fertilizer in the growing of wheat, grasses, and corn.

LEGUMINOUS CROPS ON THE PRAIRIES

MANITOBA

BY T. J. HARRISON, B.S.A., PROFESSOR OF FIELD HUSBANDRY MANITOBA AGRICULTURAL COLLEGE

THE results on the Field Husbandry Department's experimental field, and on the College farm, at the Manitoba Agricultural College, would seem to indicate that there are only five biennial and

clay subsoil, and being very flat, the water frequently lies on portions of it, from one to two weeks in the spring. Alfalfa is a crop that is not generally considered adapted to this type of soil, but it has proven to be quite



WHITE SWEET CLOVER IN FULL BLOOM. AVERAGE HEIGHT, 5 FT. 4 INS.

perennial leguminous crops that can be grown at all successfully in this province. They are alfalfa, sweet clover, common red clover, alsike and white Dutch clover.

ALFALFA

The soil on the College farm is a stiff clay resting on an impervious

hardy even under these seemingly adverse conditions. Among the hay crops, alfalfa and Western rye grass seem to be the most persistent. A field seeded down with alfalfa in 1912 produced hay each year until 1916, after that it was used as a pasture, sheep being pastured on it in the fall

of 1917 until they had grazed it bare. The field, therefore, went into the hard winter of 1917-18 in bad condition, and it was thought it would be useless the following year. While the stand killed out to a considerable extent it was still thick enough to produce pasture during the summer of 1918. In the fall of that year it

ise this spring of having come through the winter in good condition.

In the experimental field alfalfa has also proven to be hardy, this is especially so when the leading varieties are sown. The results even would seem to indicate that when the following precautions are taken it can be grown successfully every year.



VIOLET FLOWERED ALFALFA.
(NOTE ERECT HABIT OF GROWTH)

was broken up to make room for an expansion of the experimental field. In 1918 a field of 30 acres was seeded to alfalfa, without a nurse crop, on fall ploughed land. The seed was sown about June 1 and in August a small cutting of alfalfa hay was secured. After the stand had recuperated it was pastured lightly with the ewes of the flock for the purpose of "flushing". The crop was allowed to go into winter with about 8 inches of top growth, and gives prom-

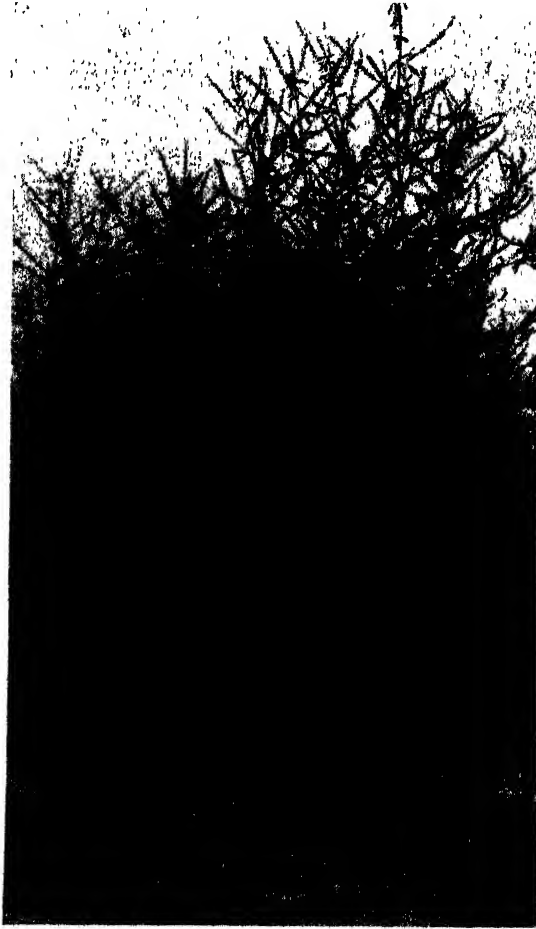
(1) Select Grimm or Baltic varieties, (2) Inoculate the seed, (3) Sow it on summer-fallow or corn land, (4) Sow between May 15 and June 15, at the rate of 12 lbs. per acre, (5) Sow without a nurse crop, (6) Allow it to go into winter with a good growth of top to hold the snow and thus prevent freezing out.

In the forage crop improvement field several strains of alfalfa have been isolated. The object in view is to combine hardiness, feeding quality,

and heavy seeding propensities. A few strains are giving promise along these lines and will be multiplied.

If a good seeder can be secured so that the cost of seed can be reduced it would seem that in this portion of the province alfalfa should become one of the important forage crops.

in along with a field of alfalfa and a field seeded with a mixture of oats and barley for pasture. The stock did not touch the sweet clover until the alfalfa and cereal mixture were pastured off. The sweet clover was by this time too rank and coarse to make good pasture, and it was conse-



A WHITE SWEET CLOVER PLANT

SWEET CLOVER

From the standpoint of hardiness none in the province will dispute that sweet clover stands pre-eminent. There are many, however, who question its value from a feeding standpoint. In 1916 a small field was sown on a piece of land where alfalfa had failed to catch because of alkali. The following summer the field was fenced

quently mown for fodder. The cattle were kept in the field however, and pastured on the aftermath of the sweet clover, the remainder of the summer and fall. They apparently relished the clover after they had cultivated the appetite, for they kept this field as closely grazed as the alfalfa.

In the experimental field it has been grown for four years with good results.

The conclusions in regard to the culture of the crop may be summed up as follows. (1) For best results sow without a nurse crop, but fair stands are sometimes obtained when

the pasture and the cured fodder standpoint.

The conclusions that would be drawn from the present data obtain-



SELECTED PLANTS OF RED CLOVER

the nurse crop is used, if the seed is sown on summer-fallow, etc. (2) Sow the seed between May 15 and June 15, (3) Sow at the rate of about 15 to 18 lbs. per acre.

able from the College farm, and from observation throughout the country, that it is perfectly hardy and is adapted to a wider range of soils than alfalfa and can be grown to advantage



COMMON YELLOW-FLOWERED ALFALFA ON LEFT. VIOLET-FLOWERED ALFALFA ON RIGHT
(Notice lower spreading habit of yellow-flowered variety).

On the forage crop improvement field considerable work has been done in an endeavour to find a strain that would be more adapted to hay production. Of the different sorts tried out, the white-flowered variety seems to give the most promise, from both

for pasture almost any place in the province.

RED CLOVER AND ALSIKE CLOVER

The red clover and alsike clover have not the wide range of usefulness that either the other two legumes

have. On the College farm they are sown in grass mixtures for both hay and pasture. The main reason for using them is that the seed is cheap, and if there is a failure to get a stand the monetary loss is not very great. In wet seasons fair stands are obtained but in dry seasons the crop is poor. Moisture would seem to be the controlling factor in growing these two clovers. This probably explains why such magnificent crops are grown east of Winnipeg, in the Whitemouth, Beausejour country. Observations would also seem to indicate that they can be grown to advantage in Northern Manitoba.

WHITE DUTCH CLOVER

The white Dutch clover is little or no use as a field crop. In places it is used in a limited way as pasture. Its greatest use in this line is in renovating grazed out native pastures. Its use in this respect is also very restricted. From work with it on the experimental field its use seemed

so limited that it has never been used as a field crop on the College farm.

CONCLUSIONS

Alfalfa is the best forage legume where it can be grown in the eastern and northern part of the province.

Sweet clover can be used for pasture, and is grown in soil and in districts where alfalfa will not succeed.

Red clover and alsike are grown in a limited way in the extreme east and north of the province where the rainfall is greatest.

White Dutch can be used to a limited extent for renovating native pasture.

The high price of seed of all the biennial and perennial legumes prevents them from becoming a common forage crop in Manitoba. When the cost of seeding an acre with legumes is from \$4 to \$12 per acre, and Western rye grass and timothy can be sown for 80c. to \$1.50, with the chances of failure with the legumes greater than with the grasses, most farmers are going to seed down with grass.

ALBERTA

BY JAS. MCCAIG, M.A., EDITOR OF PUBLICATIONS

IN SPITE of the fact that the whole of the province including both open prairie and brush country has a great variety of native legumes the tame forage legumes have not been successfully established over the province.

ALFALFA

The best forage legume of the province is alfalfa. It is characteristically an irrigation crop. It has a rapid growth and a heavy top of vegetation under favourable conditions. In Southern Alberta outside of the irrigated districts it is not uniformly successful. The soil quality is favourable but in years of light precipitation it is hard to get a good crop. On the Claresholm demonstration farm, for example, where the rainfall varies considerably, the crop

has averaged between half a ton in a dry year to five tons in a real good year. A half ton per acre is not a profitable crop. Generally speaking the chances of producing a crop of alfalfa under dry farming systems are not as favourable as they are of producing a grain crop. Where it has succeeded under dry farming it has been grown in rows.

In the central part of the province alfalfa may be successfully established on selected areas. This means on well drained, warm lands, but generally the crop is not a successful or characteristic one for Central Alberta probably owing to the dense clay sub-soil in which the plant gets wet feet. It suffers winter killing to some extent.

The varieties of alfalfa used are Grimm's, Baltic, and Turkestan.

CLOVERS

Red clover has not been a successful crop on the demonstration farms, though individuals have succeeded with it in places. It is not by any means a general crop and has not reached a point in production where it is appreciable in the fodder resources of the province. Alsike, on the other hand, is successful. Good crops of alsike are grown on the demonstration farms in the central part of the province, for example, at Stony Plain, and the south produces

good alsike under irrigation not only for fodder but for seed.

A good many people are beginning to experiment with sweet clover. The demonstration farms should probably have given more attention to this crop but it has not been favourably regarded on account of having been relegated to the weed class in places where all the other clovers can be successfully grown. This year there is a patch of two acres of sweet clover on the Sedgewick demonstration farm. It will probably be used for ensilage.

AGRICULTURAL LEGISLATION

ONTARIO

THE Ontario Legislature at its 1918-19 session passed three new acts and amended three old measures to be administered by the Department of Agriculture. A measure designated The Consolidated Schools Act to be administered by the Department of Education was also placed on the statute books. On account of its relationship to the development of agricultural education a review of this act is published, with summaries of the purely agricultural acts, as well as the table of the agricultural department appropriations.

THE COMMUNITY HALLS ACT

"An Act respecting the establishment of Community Halls and Athletic Fields in Rural Districts."—This act empowers the Minister of Agriculture to make a grant of public funds to a township establishing a community hall and an athletic field in connection therewith. The grant is limited to twenty-five per cent of the cost of the building, exclusive of the land, and must not exceed \$2,000. Debentures may be issued by the corporation to provide the necessary funds. The board of management is to consist of two members of the township council,

assisted by five members, selected by the council, from amongst the officers of local organizations, exclusive of religious or fraternal organizations, taking into account the amount contributed by each organization to the cost of erection and maintenance. A municipality may enter into an agreement with an adjoining township or village for the joint use of the hall and field.

The Minister of Agriculture is further empowered to make a grant to the board of trustees of any consolidated school which provides satisfactory athletic grounds and a community hall in or in connection with the school.

CREAM PURCHASES

"An Act to Regulate the Purchase of Cream."—This act requires that all cream purchased for sale, shipment, or manufacture shall be purchased on the basis of the fat content. The method of sampling and the manner in which tests are to be made are prescribed. A fine of not less than \$10 or more than \$50 is imposed for violation of the Act or for falsifying the test. The Minister may make such further regulations as may be necessary.

THE BRAND ACT

"An Act Respecting the Branding of Live Stock."—Provision is made by this act for the allotment of brands for horses, cattle, and sheep by the Minister of Agriculture, and for the recording, renewing, transferring, and certifying of same by the Live Stock Branch of his Department. A tariff of fees is prescribed. A brand list will be published. For the improper or wrongful use of brands, a maximum penalty of \$200 is imposed.

AMENDMENTS

"An Act to Amend The Horticultural Societies Act."—The amendment provides that cities of 100,000 or over and cities of 200,000 or over may organize two and three horticultural societies respectively, but in any case \$700 shall be the limit of the individual grant.

"An Act to Amend the Veterinary College Act."—It is enacted by this amendment that successful students of the Ontario Veterinary College are entitled to a diploma granted by the University of Toronto conferring the B.V.Sc. degree.

"An Act to Amend the Dog Tax and Sheep Protection Act."—With the assent of the electors, the council of a township in unorganized territory may pass a by-law providing that the corporation shall be liable for full compensation for the killing or injuring of sheep at large on any highway or enclosed land.

THE CONSOLIDATED SCHOOLS ACT

"An Act Respecting Consolidated Schools."—While this act has to do with education rather than with agriculture, a synopsis is given because of the close relationship existing between school consolidation and agricultural instruction.

The act provides that, subject to the approval of the ratepayers, an agreement may be entered into for

the consolidation of school sections, union school sections, portions of townships, and incorporated villages or portions thereof. To facilitate consolidation, township school sections may be divided and regarded as separate school sections for the purposes of the act.

The agreement referred to is to provide for the apportionment and distribution of assets and liabilities. It is also to apportion the cost of establishing and maintaining the school, and must be concurred in by the Minister of Education.

The act outlines the procedure in electing the board of trustees and other officers and for disposing of school property in the sections consolidating.

The Minister of Education is empowered to make regulations relating to building plans, specifications and site, number of teachers, and the payment of legislative grants. Subject to the regulations, boards of trustees may provide for the transportation of pupils, the cost to be charged to school maintenance.

Schools within a section may unite to form a centrally located school, and union school sections may be declared to be consolidated school sections.

Consolidated schools are to be deemed to be rural schools for the purposes of county and provincial grants. Township and county grants may not be less than the total paid previously to school sections included in the consolidation. If more teachers are employed than were employed previous to consolidation the grant shall be increased as provided by the act.

The act provides that where owing to the extension of the boundaries of a school section, children have to travel for more than three miles to school, the Minister may make grants for the transportation of pupils, and, if necessary, for the erection of school buildings.

APPROPRIATIONS FOR AGRICULTURE

	Including capital account	
	1918	1919
Civil Government, Printing Reports and Bulletins, Statistics, Miscellaneous.....	\$ 106,750 00	\$ 145,248 46
Agricultural College.....	353,130 52	477,635 46
Agricultural and Horticultural Societies.....	175,975 00	186,975 00
Live Stock Branch.....	65,768 74	80,750 00
Institutes Branch.....	52,079 00	49,546 50
Dairy Branch.....	148,050 00	148,050 00
Fruit Branch.....	108,604 96	88,433 54
Ontario Veterinary College.....	32,284 99	35,293 34
Agricultural Representatives.....	120,000 00	120,000 00
Demonstration Farm.....	8,000 00	8,000 00
	\$ 1,170,643 21	\$ 1,339,932 30

MANITOBA

THE acts relating to agriculture passed at the recent session of the Legislature of the province of Manitoba comprise seven new measures and nine amendments to existing acts.

The Brand Act.—This act prescribes the procedure necessary to the allotment, registration, and cancellation of brands for live stock, and the steps necessary to establish proof of ownership. The act prescribes penalties for the misuse of brands, and calls for the publication of a list of all brands recorded.

The Farm Implement Act.—This act applies to the sale of all farm implements costing thirty dollars or more, except when sold by farmers. The vendors of farm implements are required to file annually with the Minister of Agriculture a list of the implements they are selling (including repair parts), together with prices and terms of credit. In cases where the dealer or manufacturer has complied with this provision, it is not necessary for the retailer to do so, provided he notifies the Minister of his adoption of the list.

The act stipulates that contracts for the sale of implements shall be in writing, and that they are to be read and explained before being signed. Other provisions relate to the method of payment, including lien notes and their effect, right of purchaser to reject, and repossession and valuation in case of default in payment. Not more than twenty-five per cent of the earnings of an implement may be applied to the purchase price.

The Land Settlement Board Act.—provides for the creation of a Land Settlement Board by the Lieutenant Governor-in-Council. The duties of the board include the listing and pricing of unoccupied land suitable for settlement; the making of a survey of unoccupied land suitable for settlement; the making of a survey of unoccupied land suitable for farming or grazing and for the valuation of same. The board will exercise the powers of a commission in respect to summoning witnesses, taking evidence, and the producing of documents.

The Live Stock Purchase and Sale Act.—For the purpose of improving

the live stock of the province, the Minister of Agriculture is empowered by this act to purchase or raise live stock and sell the same to *bona fide* farmers actually resident upon the farms of the province. The provincial treasurer is authorized to raise \$400,000 annually for the purposes of the act by means of loans on the credit of the province. Animals sold to farmers on credit, are subject to a lien upon the live stock and their offspring. Male animals sold on credit are to be pure bred and registered; females are not to be sold on credit except at prevailing grade prices. Male animals may be sold to agricultural societies and to other approved organizations. The act provides that cattle bought outside the limits of the three Prairie Provinces shall pass the tuberculin test. The necessary staff will be appointed by the Lieutenant-Governor-in-Council and will be directed by the Minister of Agriculture.

The Poultry Breeders' Act provides for the incorporation of the Manitoba Poultry Breeders' Association. In affiliation with the association, local associations may be organized in any city, town, or municipality. Grants may be made to local associations equal to sixty per cent of the money actually paid out in prizes at winter shows. The grant to any one association is not to exceed \$500, nor shall an association hold more than one exhibition in each year. The provincial association is required to make an annual report to the Minister of Agriculture covering its proceedings and finances, and each local makes a similar report to the provincial association.

The Produce Dealers' Act.—A dealer in agricultural products or farm produce, except grain, doing business within the province, is required to obtain an annual license from the Minister of Agriculture, and to furnish a bond of three thousand dollars as security for compliance with the provisions of the act.

All produce consigned and sold on account or on commission must

be reported to the Minister. In cases where a dealer buys consigned produce he must render the vendor a statement within seven days. In case of failure of a dealer to make returns of transactions to the consignor, investigation shall be made by the Minister on receipt of a complaint certified by affidavit. The Minister may, in the public interest, cause a license to be suspended or revoked. Special penalties are provided where, upon summary conviction, persons are found guilty of infringement of the act. Such officers as are necessary shall be appointed upon the recommendation of the Minister.

An Act to enable Municipalities to borrow limited amounts of money for Seed Grain purposes.—Under this act, rural municipalities are empowered to issue debentures or to borrow from the province, or from the banks, a sum not to exceed \$60,000, in order to furnish seed grain to farmers who are unable to procure seed for the season of 1919 on account of crop damage. The provisions of the act extend to owners of land who enlisted, or to their wives or other representatives. The purchase and distribution of seed is to be made by the municipality. The provisions of *The Seed Grain Act*, Section 15–24 inclusive, apply. Loans made by the municipalities in this connection may be guaranteed by the province.

AMENDMENTS

Agricultural College Act Amendments.—This act provides (a) That one of the directors of the Agricultural College shall be a graduate of the College and a resident farmer; (b) That members of the board are to be paid for attending meetings only when such meetings are called with the approval of the Minister; (c) That appointments to the administrative, teaching, and house staff are to be subject to the provisions of the *Civil Service Act*.

The Animals Act Amendment.—This amendment increases the penalty for allowing bulls to run at large.

The Dairy Act Amendment.—This act provides that no unincorporated creamery or cheese factory shall operate until the site, buildings, machinery and sanitary arrangements have been approved by the Minister. The operation of cream-receiving stations is made illegal after May 1, 1921, and in the meantime no new stations are to be licensed.

The Drainage Act Amendment.—Provides that the Lieutenant Governor-in-Council may make settlement of unpaid taxes for Drainage District No. 1.

The Manitoba Farm Loans Act Amendment.—The amendment interprets the terms "securities" and "stocks"; increases the fees paid to members of the board of management, and provides that the rate of interest on loans shall not exceed six per cent; the two latter provisions to be retroactive to March, 1917. The act also deals with the disposition of instalment charges and the payments received from borrowers on mortgage loans.

The Gagd Roads Act Amendment.—In addition to certain minor amendments, the act provides that the Minister of Agriculture may enter into arrangement with a town or

village for the improvement of a municipal road passing through such town or village. The procedure is outlined in cases where a municipal council refuses or neglects to make improvements in great main provincial highways when the board is of opinion that such should be made, and the cost is allotted.

The Hail Insurance Policy Act Amendment.—Certain changes are made in the method of appraisal for crop damage.

The Rural Credits Act Amendment.—A number of new provisions are incorporated in this act. The objects of rural credit societies are extended to include the placing of fire, hail, and life insurance. Returns of bank loans are to be made monthly by banks to the secretary of rural credit societies. The list of collateral securities to be taken by a society is extended to include mortgages on real or personal property or assignments of agreements of sale thereof. It is also provided that the Lieutenant-Governor-in-Council may lend money to societies, the maximum to be not more than \$40,000 to any one society.

The Horsebreeders' Act Amendment.—This amendment places the burden of proof of enrolment of a stallion on the defendant in certain cases. Other changes relate to lien by owner of stallion for unpaid services.

APPROPRIATIONS

	1918-19	1919-20
Salaries.....	\$ 13,316 66	\$ 13,660 00
Supplies and Expenses.....	1,500 00	1,800 00
Agriculture and Statistics.....	122,495 00	141,350 00
Manitoba Agricultural College.....	205,135 00	237,615 00
Immigration and Colonization.....	45,000 00	42,520 00
Agricultural Publications.....	20,100 00	24,780 00
Miscellaneous and Unforeseen.....	2,000 00	3,000 00
Birtle Demonstration Farm.....	2,560 00	2,920 00
Settlers' Animal Purchase Act.....	6,800 00	8,960 00
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	\$ 418,906 66	\$ 476,605 00

BRITISH COLUMBIA

THE British Columbia Legislature at the session recently concluded passed five acts that have a close relationship to the agricultural industry. These are *The Grazing Act*, *The Mosquito Control Act*, *The Trespass Act*, *The Foul Brood Bees Act* and *The Agricultural Act*.

The Grazing Act.—The purpose of this act is to provide for the control and management of Crown ranges and commons in respect to the pasturing of cattle and other animals. The act will supersede *The Cattle Ranges Act* and *The Crown Lands Pasture Act*. Under the new act, the Lieutenant-Governor-in-Council may establish and delimit grazing districts in any part of the province, may make regulations for the control and management of Crown ranges and commons, and impose penalties for the violation of same. The Crown ranges are placed under the control of the Minister of Lands.

The Mosquito Control Act.—For the purpose of abating the mosquito pest, the Lieutenant-Governor-in-Council may on petition of ten resident rate-payers establish a mosquito control district in any part of the province. The council of a municipality in which a mosquito control district is established shall make a special levy, not to exceed two mills on the dollar, upon the assessed value of real property and improvements, to be expended for the purpose of mosquito control. In cases where a mosquito control district is not within the boundaries of a municipality, the levy is to be made by the provincial assessor and expended by the Minister of Public Works.

The measures to be adopted for exterminating the mosquito or abating the mosquito pest are to be determined by the municipal council and the Lieutenant-Governor-in-Council.

In cases where municipalities decide to co-operate in mosquito control, the appropriations may be brought into a common fund to be expended by an individual or board. The provisions

of this act may be utilized in controlling the gopher pest.

The Trespass Act Amendment.—This amendment defines what constitutes a lawful fence for the purpose of dividing railway property and right of way from other lands.

The Foul Brood Bees Act Amendment.—The amended act may be cited as *The Apiaries Act*. The amendment provides for a general revision of the old act, and the introduction of certain new provisions. The additions require that every person who keeps bees shall register with the Department of Agriculture, obtain a license, and pay an annual fee of \$1.50. Where a bee-keeper fails to produce a current certificate of registration, the inspector may destroy all bees, combs and hives.

Where disease-infested bees, hives, and appliances are destroyed by an inspector, such equitable compensation as the Minister may determine may be paid to the owner.

Every person selling British Columbia honey is required to label each receptacle with the net weight of honey and with the words "British Columbia Honey." In enforcing this provision, inspectors are given power to enter any premises where honey is sold.

The amendment also provides that a bee-keeper, in following a swarm from the apiary, may enter upon the lands of any person, but is to be held liable for damage to property caused by such entry. The penalties provided for violation of the act range from \$25 to \$100.

The Agricultural Act Amendment.—To associations incorporated under *The Agricultural Act* which are carrying on work of the same character as farmers' institutes, the Minister of Agriculture may make the same allowances as to institutes. Provision is also made for the amalgamation of associations.

Other provisions relate to the sale of nursery stock, and the licensing of persons engaged therein.

APPROPRIATIONS

	1918-19	1919-20
Minister's Office.....	\$ 9,920	\$ 11,140
General Office.....	39,979	43,144
Horticultural Branch.....	41,492	56,900
Live Stock Branch.....	38,793	35,780
Tubercular cattle compensation, supplies, temporary assistance, etc.	20,000	33,500
Automobile accessories.....		4,250
Agricultural fairs, etc.....	15,000	35,000
Farmers' Institutes, etc.....	10,000	10,000
Women's Institutes, etc.....	6,000	8,000
Grants to Associations.....	10,000	14,000
Operation of Frondeg Farm.....	25,000	
Collection of agricultural statistics.....	1,500	
Board of Horticulture.....	500	500
Departmental exhibits.....	500	2,000
Compensation <i>re</i> foul-brood in bees.....		1,000
Control of noxious weeds.....		1,000
Grants to British Columbia students.....	1,000	1,000
	\$ 219,684	\$ 257,214

NOVA SCOTIA

AGRICULTURAL ACTIVITIES

BY J. G. ARCHIBALD, B.S.A., DEPARTMENT OF AGRICULTURE

DALHOUSIE University has recently honoured Principal Cumming of the Agricultural College by conferring upon him the degree of I.L.D. This is the first time in the history of the University that a leader in agriculture has been so recognized.

AGRICULTURAL COLLEGE CLOSING

The annual closing of the Agricultural College was held on April 17. The principal speakers of the day were Lt.-Col. John Pringle, who has been overseas as a chaplain for four years, and Mr. D. A. Cameron, K.C., M.P.P. The associate diploma of the College was awarded to sixteen students, ten of whom passed with honours.

WRITINGS OF "AGRICOLA"

Mention was made in the April issue of the "Gazette" of the writings of "Agricola," which appeared in the local press just one hundred years ago. The "Acadian Recorder," which was first published in Halifax in 1813, and which is still in existence,

published the first of these letters in its issue of July 22, 1818. This journal is now making a reprint of all the letters in its regular weekly issue. When this has been completed, the manuscript will be available for publication and will be used to issue a new book of the writings. The government of Nova Scotia is aiding in the work of collecting and arranging the manuscript and in the publication of the book.

ENTOMOLOGICAL INVESTIGATIONS

In the Department of Entomology of the Nova Scotia Agricultural College a number of important investigations will be carried on this year. An acre of garden land has been assigned for work with garden insects, in which four pests will be investigated, viz., the carrot rust fly, the pea moth, the onion maggot, and the cabbage root maggot. For the study of this last named pest, two acres of cabbage and cauliflower will be set aside.

Extensive investigation in the preparation and use of suitable dust

sprays as substitutes for liquid sprays, is being carried on. For this work about three tons of various combinations of powdered fungicides, contact insecticides, and stomach poisons have been prepared, and are now being tried out in numerous orchards throughout the fruit district.

FERTILIZER EXPERIMENTS

An extensive series of fertilizer experiments extending all over the province and for a period of years, is being started this season by the Department of Chemistry. The plan is to establish at least one plot on every geological area throughout the province. The experiments include

various combinations of the ordinary fertilizers, but special stress is being laid on the use of ground limestone, alone with manure. The work is to be carried on in co-operation with the farmer on whose land the plot is located, the department supplying the seed and fertilizer, and the farmer doing the work.

Intensive experiments with fertilizers are also being started on a small scale on hundredth-acre plots, adjacent to the department's laboratory at the Agricultural College, where they will be under the constant supervision and observation of Professor L. C. Harlow, the head of the department.

QUEBEC

EXTENSION OF AGRICULTURAL REPRESENTATIVE SERVICE

BY N. SAVOIE, SECRETARY, DEPARTMENT OF AGRICULTURE

THE Agricultural Representative service of the Quebec Department of Agriculture has been much enlarged this spring. Thirteen new representatives have been added, making a total of 33. This has made it possible to provide a representative for many individual counties. There are still three districts to be divided but these include small counties where the representatives can fairly well cover the necessary work, at least for the present. Appeals to the municipalities for

financial assistance for the payment of representatives have been, in most cases, satisfactory. All but three counties having representatives have agreed to provide a bonus of from five hundred to six hundred dollars. Some of the counties have decided to grant an annual increase of one hundred dollars until the maximum of one thousand dollars is reached. The spirit promoting this attitude would seem to indicate that the work of the agricultural representative is becoming more and more appreciated.

THE IMPORTATION OF PURE BRED HORSES

BY J. A. GRENIER, DEPUTY MINISTER OF AGRICULTURE

THE Quebec Department of Agriculture, with a view to improving the horse stock of the country, has imported from the United States two shipments of pure bred Percheron stallions and mares and four Belgian stallions. Some three months ago the first shipment, consisting of 16 Percheron stallions and mares was brought in. These were readily disposed of by private

sale to farmers in the province. The more recent shipment consists of 4 Belgian stallions, 2 Percheron stallions and 6 Percheron mares in foal. These are being disposed of in the same manner as the earlier shipment. One of these mares won the first prize at the State Exhibition of Iowa. These horses were purchased from breeders in the states of Illinois and Iowa.

PRIZES AND SCHOLARSHIPS OFFERED BY AGRICULTURAL COLLEGES

THE OKA AGRICULTURAL INSTITUTE

BY BROTHER M. YVES.

THE Department of Agriculture of the province of Quebec grants to each student belonging to the province of Quebec and attending the Oka Agricultural Institute, \$7 per month of attendance. The number of grants is from 140 to 150 yearly. In addition, the Honour-

able, the Minister of Agriculture for the Province, offers each year a special prize to the most deserving student. In 1918, this prize was \$10, granted to the student who had been most successful in the various examinations on horticulture.

SCHOOL OF AGRICULTURE, STE-ANNE DE LA POCATIÈRE

BY REV. NOEL PELLETIER, DIRECTOR

GRANTS

THE Department of Agriculture of the province of Quebec grants to each student attending this School of Agriculture, who is studying according to the timetables, \$7.00 per month of attendance. This amount is placed to the credit of each student by the school bursar and is applied on account of board and lodging.

PRIZES

The Minister of Agriculture for the province of Quebec donates a prize of \$10.00 annually to the 3rd year student who takes highest standing in animal husbandry.

Two prizes of \$15.00 and \$10.00 are given by the ex-students' association each year. These are awarded to a 3rd year and a 2nd year student who especially distinguish themselves in good conduct and application to practical and school work.

Each year special prizes are donated by individuals interested in the work of the school. These are awarded to students taking highest standing in the subjects designated by

the donor. The following special awards were made this year: Five dollars donated by Rev. Edouard Martin, to the student who has shown the greatest ability in practical work on the farm; five dollars by Mr. G. A. Michaud to the 3rd year student obtaining the highest standing in the study of agriculture; five dollars donated by Notary Dupuis, Professor of Rural Law, to the 3rd year student who has distinguished himself in the study of rural law; five dollars donated by the school agricultural club and drawn by lot by the students who have given lectures during the year; five dollars offered by Mr. Albert Sirois, Teacher of Rural Mechanics, granted to the 3rd year student ranking highest in the study of rural mechanics; cash prize offered by Mr. Albert Sirois to the 2nd year student of the farmers' course standing highest in the study of agricultural machinery; third centenary medal in memory of the arrival of Louis Hebert, offered by the school to the student who has most distinguished himself by his good conduct and application.

ONTARIO

ONTARIO AGRICULTURAL COLLEGE

A MEMORIAL HALL

BY PROFESSOR WADE TOOLE, B.S.A.

A MEMORIAL hall to commemorate the lives and deeds of more than one hundred ex-students of the Ontario Agricultural College, who gave their lives in the great war, is to be built on the college campus.

The proposed building is to constitute an assembly hall with a seating capacity of at least eight hundred. It is to be of cut stone construction, of modified Gothic design, with tower and chimneys. The interior is to be fitted with a large stage, pipe organ, and other requirements to complete a modern assembly hall.

The building will cost in the neighbourhood of \$100,000. The Ontario government has voted \$40,000 as

their contribution. A committee with Dr. Geo. C. Creelman, president of the College, as chairman and treasurer and D. H. Jones, Professor of Bacteriology, as the secretary, has been appointed to raise by popular subscription the remainder of the money necessary to complete the structure.

A subscription list has already been opened and to it the heads of the various departments of the college are giving \$100, the associate professors \$75, and lecturers and demonstrators \$50 each.

An appeal is made to all students, ex-students, graduates, staff, and others who feel an interest in contributing to this fund.

ADDITIONAL PRIZES FOR STUDENTS OF THE O.A.C.

IN ADDITION to the list of prizes mentioned in the Agricultural Gazette of March, the following have recently been offered to students at the Ontario Agricultural College;—a twenty-five dollar gold medal to be awarded to the Ontario student ranking highest in competitions at the Chicago International Exhibition,

donated by members of the year '19 stock judging team; four silver medals to be awarded annually to the champion debating team at the Ontario Agricultural College, provided by a fund subscribed by the graduating class of year '19 and deposited with the President of the College.

WELLINGTON COUNTY

EDUCATIONAL WINDOW DISPLAY

BY R. H. CLEMENS, B.S.A., AGRICULTURAL REPRESENTATIVE

WE ARE using the front window of the Agricultural Representative's office in calling the attention of farmers to practices they would do well to observe. To interest farmers in treating oats for smut, a gasoline barrel was placed in the window bearing the label "Forty gallons". On

top of the barrel was a bag of oats bearing the large label "Treat your oats for smut". Resting on the bag was a pint of formalin and a pint measure and just back of this in large letters "One pint of formalin to forty gallons of water".

To emphasize the necessity of testing corn seed we displayed two

trays of growing corn, one testing sixty-six per cent and the other testing eighty-eight per cent germination. The corn plants were about two inches high when put in the window.

As the season advances other activities will be demonstrated. To

call attention to the importance of surface cultivation, glass tubes filled with soil of different kinds will be displayed to show how water rises in the different types of soil. We shall also expose a wool packing box and opposite it a fleece wrapped up as it ought to be.

OXFORD COUNTY

CO-OPERATIVE PURCHASING

BY G. R. GREEN, B.S.A., AGRICULTURAL REPRESENTATIVE

THE Woodstock District Farmers' Club, which has been working under a charter since December last, is doing a thriving business in co-operative buying. This club has a standing account of ten thousand dollars in the bank which enables it to buy favourably. A carload of oil cake purchased at \$63 a ton could not have been secured

locally for less than \$70. It has had the same experience with salt, bran, shorts, and other feeds. A building has been purchased for the storing of feed and as a centre for the handling of eggs. An adjoining club has purchased land for the erection of a building which will be used as a store room and for the grinding of grain.

MANITOBA

DAIRY TRAINING COURSE

BY R. W. BROWN, B.S.A., PROFESSOR OF DAIRYING, MANITOBA AGRICULTURAL COLLEGE

DURING the past winter a short course in factory dairying was conducted by the Department of Dairy Husbandry of the Manitoba Agricultural College. The course, which extended over a period of ten weeks, beginning on January 2nd, had an attendance of fifteen young men, at least twelve of whom will be engaged in creamery work in the province of Manitoba this season.

The work of the class each day was divided into four periods. From 9 to 10.30, and from 2.00 o'clock to the end of the afternoon the students were at practical work in the dairy laboratories. From 1.15 to 2.00 o'clock was employed as a lecture period in dairying. From 10.30 to 12.00 the students received lectures from other departments on such phases of their work as related to dairying.

In the Dairy Department proper, in which three-quarters of the time of the students was spent, the work consisted of manufacturing dairy products, and lectures which dealt with the testing of dairy products suitable for all creamery purposes, the production and care of milk and cream, pasteurization, creamery butter making, cheddar and soft cheese making, ice cream making, the care and handling of cream separators, the scoring and grading of milk, cream, butter, and cheese, the making of starters, factory management, cow testing, etc. In this work the staff of the Dairy Department was assisted by Mr. L. A. Gibson, Dairy Commissioner for the province, who aided more especially in scoring and grading butter.

SASKATCHEWAN

A LIVE STOCK COMMISSIONER APPOINTED

MR. J. G. Robertson, B.S.A., has been appointed Live Stock Commissioner for Saskatchewan. Mr. Robertson was born and brought up on a Nova Scotia farm. He is a graduate of Macdonald College and while a student there led the winning team at the International Live Stock Judging Competition at Chicago in 1911. He spent a year on the Macdonald College farm after graduating. He has had considerable experience in addressing farmers' meetings. Previous to going overseas in 1916 he was live stock manager, then assistant manager and finally general manager of the S. G. Detchon Farms in Saskatchewan, which produced in one season 130,000 bushels of wheat besides other crops and live stock.



LIEUT. J. G. ROBERTSON, B.S.A.

DISEASE RESISTANCE OF POTATOES

BY JOHN BRACKEN, B.S.A., PROFESSOR OF FIELD HUSBANDRY

OUR work at this station has not indicated that there is any difference in the resistance to rot of different potatoes providing the varieties are free from disease. The chief point of interest in all our selection work is the fact that such increases in yield as we have been able to secure as a result of selection, appear to have been due not so much, if at all, to variation within the variety or strain as to the presence or absence of disease of one kind or another in the strains selected. In most cases where a strain is

outstanding in yield it has been found on careful examination of the growing crop that such a strain is practically free from disease, while others beside it that have not done as well are affected with curly dwarf, mosaic, leaf roll, or other disease. We have about reached the conclusion that in future our selection work, within pure lines at least, will be developed chiefly along the line of the elimination of diseased plants in the growing crop and diseased tubers in the progeny.

BETTER FARMING TRAIN

THE Department of Agriculture of Saskatchewan, co-operating with the College of Agriculture of the Provincial University, and the Canadian Pacific Railway Company, will run a Better Farming Train over the lines of the Canadian Pacific

mechanics, boys' and girls' work, and household science.

The live stock section will comprise three cars of choice live stock supplied by the College of Agriculture. The stock will include representatives of dairy, beef, and dual purpose cattle,



REPRESENTATIVES OF FIVE BREEDS OF CATTLE

Railway in the south western portion of the province during one month ending June 28. This service, which is made possible by appropriations from *The Agricultural Instruction Act*, has become an important

a Clydesdale mare, representatives of Yorkshire, Berkshire, and Tamworth hogs, and some range ewes with their progeny of the first and second crossing, sired by pure bred rams. A covered flat car will be used



THE LIVE STOCK CARS

annual feature of the agricultural extension work of the province. The train will consist of thirteen lecture and demonstration cars equipped to give instruction on live stock, field husbandry, poultry, farm

as a platform from which to display the animals during the demonstrations.

The field husbandry section will comprise one demonstration car containing an attractive display of soil

products, charts illustrating results obtained from experimental work with field crops, also one lecture car in which agricultural authorities will discuss local problems relating to tillage methods, moisture conservation, and the growing of cereal, hay, fodder, root, and other crops.

One demonstration car will be used to provide poultry instruction. In this will be carried live specimens of the various breeds of poultry suitable for Saskatchewan. Brooders and incubators in operation will be shown as well as model poultry houses, and

model dairy equipment, etc. Lectures on farm layouts, building construction, water supply, the draught of implements, and kindred topics will be given in a special lecture car.

A special section will be devoted to the instruction and entertainment of boys and girls. Lectures, illustrated by lantern pictures, will be given on such topics as birds and insects native to Saskatchewan, public buildings of Saskatchewan, school gardening, contests for boys and girls, etc.

Two cars will be devoted to household science, one for lectures and



DEMONSTRATED LIVE STOCK LECTURE

other material. Lectures on poultry topics will be given in a special lecture car.

The farm mechanics' section will consist of two cars of mechanical exhibits including sectional models of farm buildings, illustrating convenience of arrangement combined with proper provision for lighting and ventilation; sectional models of steam and gasoline engines, a working model of a pneumatic water supply system, and an electric lighting system suitable for a farm home;

demonstrations, the other, a nursery car in charge of a matron where the younger children will be looked after. Lecturers and demonstrators will deal with such matters as food values and proper cooking, laundering, sewing, sanitation, ventilation, and home nursing. Labour saving devices suited to rural conditions will be displayed.

The tour arranged provides for stops at fifty-eight points at the rate of two a day, that is from 9 a.m. to 1 p.m. and from 2.30 to 6.30 o'clock.

ALBERTA

MR. S. G. CARLYLE, LIVE STOCK COMMISSIONER

MR. S. G. CARLYLE has been appointed to the position of Live Stock Commissioner for the Province of Alberta and began his duties on May 1. Mr. W. F. Stevens, who has occupied the position for the past ten years will move to Spirit River in the Peace River country to give general direction to agriculture and settlement through this new country.

Mr. Carlyle came to the province from Chesterville, Ont., where he owned and operated a dairy farm. He had a good stock of pure bred Holsteins and also bred registered Clyde horses. Mr. Marshall secured Mr. Carlyle to undertake dairy instruction on the Demonstration Farm in 1913. In 1915 he was made Superintendent of Demonstration Farms, in succession to Mr. Craig.

Mr. Carlyle is a critical judge of all classes of live stock and is a practical man in the economy of live stock feeding. He has given a good deal of attention to the matter of cost of production in dairy and beef enterprises and has had wide

experience in the different systems of rotation and land treatment suited to the support of live stock in different parts of the province.



MR. S. G. CARLYLE.

INVALIDED SOLDIERS' AGRICULTURAL COURSE TO BE CONTINUED

BY E. A. HOWES, B.S.A., DEAN OF THE COLLEGE OF AGRICULTURE

THE course under the Invalided Soldiers' Commission for returned soldiers at the College of Agriculture, University of Alberta, referred to at length in the April number of The Agricultural Gazette, will be maintained throughout the summer. It was expected that the attendance would be so small as possibly to make it advisable to close up for a few months. The attendance has been so large, however, and as many new students are coming, the course is being continued. Lately there have been introduced into the course several interesting

branches of instruction calculated to be of great assistance to the men when they take up their new farms.

We had the men cut a bunch of good size poplar trees. These were trimmed, cut in lengths, sided, notched and used in practice work in shack and stable building.

By request the men were given instruction in canning. They had grown beans, beets, and other garden truck in the large greenhouse and this furnished material for some very interesting and helpful work in canning.

The men were given instruction as well as docking, dehorning, and in some of the simple standard other surgical operations in the forms of cooking. As many of them various classes of stock.



RETURNED SOLDIERS JUDGING DAIRY COWS

are going out to live alone for a time on their holdings, this instruction must be of considerable assistance.

The attendance and interest in the work has been well kept up and the course has been one very



RETURNED SOLDIERS STUDYING FARM MECHANICS

Demonstrations have been given in the testing of cattle for tuberculosis, inoculation for black leg,

satisfactory and gratifying to the members of the staff of the College of Agriculture.

BRITISH COLUMBIA

THE QUARANTINING OF BEES

BY virtue of the Foul Brood Bees Act of 1911 bees imported with their hives into the province of British Columbia are required to be quarantined at the point of entry or at such other place as may be officially designated for a period of not more than nine months. If imported bees are found to be infected

they shall be destroyed by direction of the local inspector of apiaries. Further the removal of bees from prescribed areas is prohibited unless accompanied by a certificate of the inspector showing that the apiary from which they are shipped has within two months been inspected and found free from disease.

EGG-LAYING CONTEST

BY J. R. TERRY, CHIEF POULTRY INSTRUCTOR

THE following is a summary of results of the seventh international egg-laying contest held at the exhibition grounds, Victoria, B.C. from October 25th, 1917, to September 24th, 1918. This work

is carried on with funds provided by *The Agricultural Instruction Act*. These contests are held under the auspices of the Provincial Department of Agriculture.

Summary of Results

Duration of Contest (months)	11
No. of pens	40
“ birds	239
“ eggs laid	36,996
Value of eggs laid	\$1,541.50
Average monthly revenue	\$140 13
Average monthly feed cost	\$68 70
Cost of feeding	\$755.70
Profit over cost of feeding	\$785 80
Average price of eggs per dozen	50c.
Highest price received per dozen (Nov. 22)	70c.
Lowest price received per dozen (Mar. 30)	40c.
Average cost to produce dozen eggs	24. 5c.
Average No. of eggs laid per pen	924. 9
Average No. of eggs laid per bird	154. 7
Average cost of food per pen (6 birds)	\$18 89
Average cost of food per bird	\$3 16
Profit over cost of food per pen	\$19. 64
Profit over cost of feed per bird	\$3 28
Eggs laid by winning pen, Class one	1,077
Average per bird by winning pen, Class one	179. 5
Eggs laid by winning pen, class two	1,070
Average per bird by winning pen, class two	178. 3

Comparison between fifth Contest, 11 months' duration, 1915-16 and seventh (11 mos.)-1917-18.

	5th Contest	7th Contest
No. of eggs laid	36,382	36,996
Cost of feed	\$436.45	\$755.70
Profit over cost of feed	\$594.43	\$785.80
Average price of eggs	34c.	50c.
Cost to produce doz. eggs	14. 3c.	24. 5c.
No. of fowls to Contest	240	239

PART III

Junior Agriculture

DEMONSTRATIONS, COMPETITIONS, AND CLASS-ROOM STUDIES IN RURAL
LIFE FOR BOYS AND GIRLS

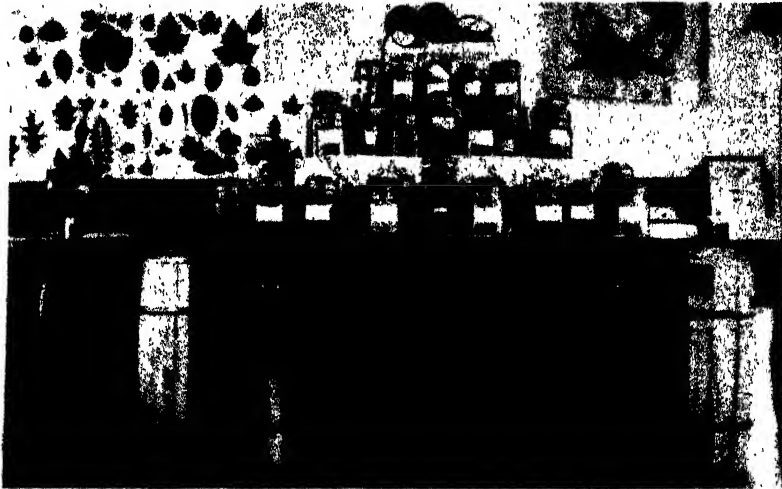
NOVA SCOTIA

THE DUTIES OF THE TRAVELLING TEACHER

BY MISS G. M. MARSTERS, RURAL SCIENCE TEACHER

THE duties of the travelling teacher, of which there are several in this province, are undefined and their experiences are extremely varied. At the short course held during the winter at the Agricultural College the travelling teachers met in conference, exchange-

permanent library and a magazine table in each school. She organizes clubs, the nature of each of these depending on local conditions. The most common of these are garden, improvement, sewing, and canning clubs. She endeavours to secure closer co-operation between home and



A SCHOOL CANNING COLLECTION

ing plans and receiving new ideas and fresh enthusiasm from the Director, Professor L. A. DeWolfe.

Each travelling teacher receives each month a dozen or more books which she distributes amongst the teachers of the schools she visits. She also endeavours to secure a

school by holding, where possible, "Mothers' Meetings" by giving demonstrations in cooking, and by assisting the regular teachers in school entertainments and social and public meetings.

The most important feature of the travelling teachers' work is the inter-

esting of the children in gardening through the home and school garden. Garden contests are organized and school exhibitions held. These stimulate greater activity among the children and create livelier interest among the parents. I enclose a photograph of the first fair in a small one-room school in my district. In this school there was no pupil above Grade VII.

The experiences of the teachers vary. What I have written is largely my own. Miss Margery Boss in Cumberland county has described her experiences in the following report to Director DeWolfe:

TEACHERS' INSTITUTES

"We have organized a small teachers' institute of the teachers of Wyvern, Collingwood, Rr. Philip Centre, Rr. Philip and Glenville schools.

"Both teachers and pupils have welcomed the circulating library. All of my monthly supply, and the most of my other books are already in circulation. The plan of allowing pupils a reading period during school hours as a reward for quickness or neatness in class work seems to work well. Here we use not only circulated books, but also pamphlets, thrift magazines, and any magazine or bulletins we can collect.

"I have organized nine clubs which in some cases meet weekly, in others, fortnightly. The teacher is merely the supervisor. All officers are elected from the pupils, and thus we hope to teach them how to conduct a meeting properly. The minutes give a chance to bring in composition. They must be approved by the teacher as to neatness, writing, and composition.

"Each club has a charter printed in their club colours giving name, purpose, and rules of the club. In one section two women are coming to teach the girls to sew. While the girls sew the boys will make articles such as breeding cases for insects, birds' houses, stretching boards, etc.; also do work in seed testing.

"In some sections the people seem to prefer to have the children learn of injurious

insects, plant diseases, and natural resources, rather than sewing. In such places our club work consists of discussions on such subjects.

"Many schools have no reference books. Here in our clubs the children have ordered bird pictures with descriptions; and of these at our club meetings, they will make a bird scrap book for reference purposes.

"Audubon Societies are popular. All children are interested in birds. In four schools where the children were anxious to own a thermometer, we organized contests between adjoining clubs. The one which has the most complete and neatest weather record for a month is to receive a thermometer.

SOLICITING FOR LIBRARY

"In one club the children are very anxious to have some books of their own. Their teacher and I have agreed to spend Saturday seeking help in the section. We will solicit money or books (the latter, either reference books, or such standard fiction as Scott, Dickens, etc.). The people are very interested in the school and I believe we will be quite successful. Two people to whom I was speaking of the circulating library offered to give us a book.

"In the same section two women have ordered scrim for sash curtains for windows, to make the schoolroom more homelike. The girls in the club are to make the curtains in their sewing class. If we could make more schoolrooms look brighter and prettier, I believe much better results might be obtained in school work.

A MINERAL COLLECTION

"I have a small mineral collection which I am circulating. In the spring we plan to form club contests in garden work between adjoining sections; but will tell more of that when our plans are more matured. So many people say to me: 'I think school clubs are splendid. They give the children a chance to gain confidence as well as to learn to conduct a meeting properly.' When the children have become a little better acquainted with their duties as club officers, we plan to have some public club meetings. The parents will be interested to see how their children are getting along and we hope thus to bring the parents into closer touch with the school."

ONTARIO

AGRICULTURE AS EDUCATION

SUMMARY OF AN ADDRESS BY JOHN DEARNESS, M.A., PRINCIPAL OF THE NORMAL SCHOOL, LONDON, ONT.

IN the Report of the Minister of Education (for Ontario) recently published it is stated that "there always has been and is still a feeling among the farmers themselves in opposition to the introduction of agriculture" into the public schools. For the statement—one that is often made elsewhere—it is worth while inquiring into the reasons. Permit me to say that I was raised on the farm, have lived with farmers a good part of my life, and believe that I can see the situation from the farmer's view point. What he disparages is that his neighbor's daughter, possibly a city girl, hardly out of her 'teens should set herself up as an authority on his life-long trade or pretend to teach his children about the mistakes their father is making in farming. On the other hand if she makes no claim to know the right culture of various crops, the methods of improving herds, and selecting and mixing the suitable fertilizers, but confines her activities to impaling insects, making drawings or collections of seeds, mounting various museum specimens, and cultivating a few plots of flowers and vegetables in the name of a school garden, he thinks his children's time may be more profitably employed in what he calls the essentials. I do not know of a single instance where the subject of agriculture was properly introduced at the first trial of it that it met with any objection from a farmer.

A LIBERALIZING VALUE

The subject of agriculture can be taught so as to have a liberalizing value like language and science, a socializing value like civics and history, and a vocational value. Prematurely forcing the vocational phases of the subject is the chief shortcoming of our present day

efforts. The experience, and opportunities for experience, of children living on the farm—and this as well as the rural-home view point should be intimately known by every rural teacher—can and should be used to deepen the children's sympathies, multiply their interests, and develop their powers of investigation. The gardens at school and homes and the near-by farmyards are the almost sufficient laboratories for the realization of these aims.

The use of the time of children below the high school entrance standard in filling note-books with vocational information in paragraphs about breeds of live-stock, formulae for insecticides, rules for mixing fertilizers, etc., is comparable to the nearly obsolete practice of memorizing lists of counties, rivers, and capes in the geography lesson. The average child under fourteen would derive much more benefit from studying in the school-yard under intelligent direction the adaptations of the hoof, mouth, and other organs of a cow, even though she be a scrub, than by looking at pictures and learning comparisons of Holsteins with Short-horns. The sympathetic, first-hand study of a useful farm animal that responds to human care and kindness and that can, like the children themselves, be hungry and afraid, can get angry and fight for its young, is incomparably better for public school grades than speculating on the prospective profits of preparing it for the butcher's block.

It is one thing for teachers to acquire knowledge of crops and animals, soils and insects from manuals and lectures but quite another thing to learn how to use this knowledge for the education of public school children. If we had agricultural high schools with ample areas of land and farm buildings, in these we might

very well attempt vocational agriculture. In the public schools there is very little of agriculture that cannot be taught and should not be taught with a liberalizing and socializing aim as nature study, granting that the term nature study is properly understood.

AGRICULTURE AND NATURE STUDY

In the Report on the Agricultural Instruction Act for the year 1917-1918 we are told that "in Ontario agriculture and nature study are two distinct subjects", while "in British Columbia elementary agriculture is regarded by the educational authorities as occupying a dual position. (1) for its own sake as a preparation for practical work in farming, (2) for the broader educational or disciplinary value. In the lower grades the latter aim is obviously most important and the former merely incidental, while in the advanced and high school grades the order is reversed and the scientific and economic viewpoints are uppermost. In the lower grades the work begins as an intimate personal study of environment, more or less informal in its character and closely adapting itself to those interests that predominate in the developing child's mind. In other words, the study of the forms, forces, and relationships of the child's natural environment afford the logical and proper basis for further advancement along the line of agricultural study. In this sense elementary agriculture is merely applied nature study. The agricultural work of the public schools, which includes the entire programme of nature study and school gardening, is the logical antecedent of a more scientific study of agriculture in the high schools."

Every student of the pedagogics of agriculture for children in the elementary schools will certainly endorse the British Columbia attitude. Indeed it is hard to see why some of the promoters of agriculture in the public schools are so much afraid of its

being confused with nature study. Making lists of topics that can be taught as nature study which are not covered by the term agriculture proves nothing to the point. It is easy to make a list of agricultural topics that can be taught and should be taught as nature study; and, for children living on the farm, by the time this list is completed it will be found that as much time as can be spared for nature study is taken up. In this way good teaching in both subjects is economically provided for.

THE DEVELOPMENT OF THE CHILD

The manual on this subject, although written mainly with the vocational aim in view, starts out with this valuable truth that the development of the child is more important than the information with which his memory may be loaded. Now the mental development of a child naturally follows the satisfaction of his desire to know the whys and wherefores of the facts, especially when the knowledge comes through his own research. I heard a speaker, emphasizing the vocational side, say to a body of teachers that if the class asks you why the mixture in the Babcock bottle becomes hot tell them not to mind that; make them expert in the art. This seems pedagogical heresy; better not to trouble with Babcock's test at all than to use it to quiet the spirit of investigation.

The true teacher would say: I am glad that you asked that question; I do not know the reason myself but now that you have asked it let us both try to find out. Work ceases to be drudgery when the worker's attitude towards it is inquisitive, experimental, interested. It should be kept in mind that the elementary school is foundational and not immediately vocational in either city or country. Agricultural nature study in the public school bears the same relation to farming that manual training does to carpentry; it is good for everybody whether for life on the farm or elsewhere.

No child is old enough to study agriculture who is too young to study it by laboratory method. That is where the importance of gardening is determined. A school garden is not a good laboratory without weeds and insects, fertilized and unfertilized plots, plants too close to each other and too far apart, in short without the exhibits of mistakes and their corrections. The proper use of the school garden is not to produce big cabbage-heads but well-developed children's heads and bodies too. Hence in the school garden there ought to be plots for single pupils or small groups of pupils and larger experimental plots for which the teacher and the school as a whole are responsible. In rural schools there is opportunity for nearly every pupil to have a home garden and here is the place for the application of lessons learned in the school garden. The home garden should be as large as practicable, clean and well cultivated, and well filled with well-grown vegetables and fine flowers. The teacher should have detailed knowledge of and interest in all the pupils' home gardens. It is from these that the

articles for exhibition at the school fairs should be taken.

THE AGRICULTURAL PROJECT

The home garden, the "agricultural project", and the school fair can be intimately related. They have large educational possibilities if rightly managed; indeed the combination can then hardly be rated too highly. There is, however, occasion for a word of caution. Every up-to-date speaker and writer on school management lauds co-operation in contrast with competition as a motive in social and moral education. The school fair is stressing rivalry and competition so strongly that in some instances the stories of dishonesty among competitors have travelled farther than the reports of the merits of the articles exhibited. One would like for once to attend a school fair tingling with the spirit of co-operation. The evils of the prize system in school work generally are admitted; it can hardly be injurious every where else and wholly beneficial in agriculture. There is an educational problem here which managers of these worthy institutions should consider seriously.

THE FINCH PIG CLUB

BY F. A. WIGGINS, AGRICULTURAL REPRESENTATIVE DUNDAS COUNTY

THE boys and girls of Dundas County are taking a very creditable interest in the pig club movement. This is an exceedingly hopeful sign not only for the effect that it will have and the training it will afford the rising generation, but also because of the effect it has in improving the production of the father's farm. The extent of the interest manifested was shown in a rally held in the interest of the Finch Pig Club, when upwards of 700 boys and girls, teachers, trustees, and parents attended. The Finch Pig Club was organized late last season with a membership of 16, who took advantage of the loan afforded by the Merchants'

Bank, the manager of the local branch of which has taken a keen interest in the work. The members were given the privilege of securing their own pigs, one of which they were expected to keep as a brood sow, but as only two of the members secured pure bred sows this rule was not strictly enforced. We hope this year to extend the work considerably and shall insist that one of the pair of pigs which each member secures will be from a pure bred sow. The pigs are secured at the age of from six to eight weeks, and the members are permitted to make their own selection from recommended litters. When the fall exhibit of the club pigs is made we intend to hold a day of

sports which will be made a rally day in so far as is practicable.

The rally day which was so successful was held to afford an opportunity of explaining the club work and to get as many as possible of the children sufficiently interested to become members. Rather than visit the various localities one big rally was held for which a programme was prepared. The programme consisted of chorus singing, lantern slides, motion pictures, and addresses on pig club and school fair work. On account of the limited space of the hall and the large attendance, the programme had to be given three times. Invitations were sent to each school teacher within ten miles of Finch asking them to have as many as possible of their pupils come in on Saturday afternoon. The success of the attendance proved the value of the teachers as a medium of advertising. To further increase the interest and to have as many as possible of the schools represented, a prize was given by the club out of the funds secured last year, to the pupils in each school for an essay to be written on one of a number of topics. The announcement of the winners was withheld until the day of the meeting, when the awards were announced and presented.

Our experience leads us to conclude that we made a good move when we allowed the members to pick their own stock from recommended animals rather than have some one pick the animals to be handed over to the

member at a certain price. I am satisfied that this rally has led to a deeper interest on the part of the children. The pigs were selected from breeders of pure bred pigs in the district, from whom the best pigs of the litter were secured at prices not running above \$12.

Following are the conditions under which the members secured their pigs:

REGULATIONS OF PIG CLUBS

The bank will lend sufficient money to any competent child between the ages of 8 and 18, to purchase two pigs of an age of about 6 weeks, one pig to be raised for meat purposes and the other to be retained in order that a litter of pigs can be raised the next year.

The pig fed for slaughter and sold in the fall should pay off the loan.

A membership fee of 50 cents is to be kept in the bank as an insurance fund against occasional unavoidable losses; these losses are charged to the fund but if there are no losses the 50 cents will be refunded at the end of the season to the members.

Money will be advanced on the note of the boy or girl at 6 per cent.

The parents have nothing to do with the transaction except to sign off any claim to the ownership of the pigs or the profit from them.

Each member must care for his stock in person and keep a record of the feed given and the pasture grazed.

Each member must wherever possible show at least one pig at a special fair at Finch to be arranged, full particulars of which will be sent to each member.

Each member must furnish the bank with a final report of the season's work, which will include the amount of feed consumed, gains in weight, cost of gain per pound, method of handling and management.

ALBERTA

MANUAL TRAINING IN THE PUBLIC SCHOOL

BY J. T. ROSS, DEPUTY MINISTER OF EDUCATION

THE work in manual arts as outlined by the Department of Education, is included with the art and the household arts under the general term of industrial education. Plans are under way to correlate these three lines of work much more closely than they have been

in the past, particularly in the lower grades. In the first four grades the work is the same for both boys and girls. This includes work with paper and thin cardboard, modelling in clay or prepared modelling material, basketry, textile weaving, and drawing and design. Most of the drawing,

and much of the modelling and paper cutting leads directly to the art work, the weaving and basketry leads towards the sewing which is given to the girls in Grades V and VI, while the work in paper and cardboard is a preparation for the cardboard construction given to Grade V boys. Woodwork with elementary mechanical drawing is outlined for Grades VI, VII, and VIII. This work is continued in the high school with mechanical drawing and woodwork, including the use of woodwork machinery, for Grade IX and the mechanical drawing and forging for Grade X.

For the encouragement of this work the Department of Education is offering liberal grants to teachers as well as districts where this work is carried on with a qualified teacher in charge.

TRAINING THE TEACHERS

Instruction in elementary manual arts, covering the work as outlined for Grades I to IV, is being given in the provincial Normal Schools to all students. This is given once a week and amounts to about 30 hours work. In addition, the men receive instruction in elementary woodwork. As many of the men come from districts where woodwork has not been taught this work is in most cases quite limited.

Well organized courses leading to elementary certificates in woodwork and the elementary manual arts are offered at the Summer School for Teachers, at the University of Alberta, under the direction of the Department of Education. The work for each of these certificates requires the student's full time for two summers, or about 260 hours work. The courses for the elementary manual arts certificates include mechanical drawing, design, manual arts suitable for Grades I and II, and for Grades III and IV, cardboard construction, and methods of teaching manual arts. For the woodwork certificate the teacher takes courses in design,

mechanical drawing, woodwork suitable for Grades VI to VIII, and methods of teaching woodwork. Special attention is given to conditions and problems of the rural, consolidated, and village districts.

More advanced work along these lines was outlined and started at the Provincial Institute of Technology and Art, in Calgary but was discontinued because of this institution being used by the Invalided Soldiers Commission for the retraining of returned soldiers.

THE EQUIPMENT PROVIDED IN THE SCHOOLS

For the encouragement of the manual arts work in the schools the Department of Education is offering grants as follows:--

The City of Calgary has 8 woodwork centers in addition to the Victoria Prevocational School, the Normal School, and the Crescent Heights High School, the latter being also equipped with drafting room and forge shop. The Prevocational School, which gives instruction to Grades VII, VIII and IX, is equipped with woodshop, including woodworking machinery, as well as the usual bench and tool equipment, metal and leather working shop with provision for forging, sheet metal work and shoe repair, print shop, and drafting room.

Edmonton has 11 public school woodworking centers in addition to the Technical School. The latter is equipped with a large wood shop including machinery, drafting room, print shop, forge shop, and machine shop.

In Camrose, the accommodations for elementary manual arts and woodwork provided for the Normal School are also used for instruction to public school Grades V to IX.

Lethbridge has a well planned and equipped manual training building but discontinued this work at the beginning of the war and has not started it again.

Medicine Hat was building a high school of the composite type but discontinued operations because of conditions caused by the war and has not yet resumed the work. They have two manual training centers and it is expected that these will be in operation again next fall.

Several other towns in the province are now considering the installation of manual training equipment. Alberta at present has 27 woodwork shops equipped for public school use, of these 5 have woodworking machinery.

RAW MATERIAL

As a rule the materials for the maintenance of the manual arts work in the lower grades are supplied by the local school board; in the upper grades partly by the school board and partly by the pupil; while in the high school the pupil pays for most of the cost of materials. For example:—In the public schools of Edmonton (Grades VI to VIII) 35c. is set as the cost of material allowed for any model. If the pupil wishes to make a larger model or use more expensive material he must pay the cost of such material. As the material for many of the models in Grades VII and VIII will cost more than 35c., this brings the cost to the school board down to about 45c. per pupil per year. In the high school each boy makes his model with the understanding that he pay for the cost of the material used in its construction when he takes the model away from the shop. In this way the cost to the city for materials is very small.

In the provincial Normal Schools and practice schools connected therewith and in the Summer School all materials are supplied by the province.

THE PLACE IN THE CURRICULUM

In the regular public schools this work occupies the same place as other school subjects. Outside of the prevocational schools the approximate time per week devoted to this work is about an hour for each of the grades from I to V, $1\frac{1}{4}$ to $1\frac{1}{2}$ hours in Grade VI, $1\frac{1}{2}$ to $1\frac{3}{4}$ hours in Grade VII, and from 2 to $2\frac{1}{2}$ hours in Grade VIII. In Grades IX and X one hour per week is devoted to the mechanical drawing and two hours to the shop work.

It is now the plan to have this work inspected and if it is found up to the proper standard, the report on the standing of the pupils given by the instructor is accepted by the Department of Education in place of an examination in this subject.

In the Prevocational and Technical Schools much more time and emphasis is given to this work; about half the time being devoted to the shop work and drawing. The Edmonton Technical School provides the manual training instruction for all of the high school boys of the city in Grades IX and X and also has a small group of regular students in Grades IX, X and XI who usually specialize in some particular field, as drafting or machine work, and at the same time carry on their academic work as outlined by the Department of Education.

WHETHER OR NOT THE SUBJECT IS COMPULSORY

The work in manual arts as outlined in the course of study is considered the same as other subjects. However it cannot be compulsory in all schools for promotion from one grade to another because of the lack of accommodations for the work in many of the towns and rural districts.

JUNIOR WOMEN'S INSTITUTES

FIFTEEN junior women's institutes have been organized in the province of Alberta.

These are comprised of girls between eleven and eighteen years. Eight is the minimum number for organization.

The institutes elect their own president, vice-presidents and secretary, but a member of the senior women's institute is usually chosen as supervisor. A membership fee of not less than twenty-five cents is charged. The provincial Department of Agriculture provides a grant of five dollars to each institute. The work undertaken varies to some extent with the different institutes and includes first

aid, and Red Cross work. In some cases two meetings a month are held, one of which is usually social in character and the other devoted to more serious undertakings. The various activities provided by the constitution are competitive games, a study of civics, literature, art, music and the drama, encouragement to gardening competitions, and the study of agriculture.

CANADIAN BANKERS' COMPETITION FOR BOYS AND GIRLS

THE Minister of Agriculture has completed arrangements with the Canadian Bankers' Association to continue "The Canadian Bankers' Competitions" during the present year. In this competition, the Canadian Bankers' Association, acting in co-operation with the Dominion Department of Agriculture, Live Stock Branch, offers cash prizes to boys and girls who exhibit pigs or calves at their local fair, and who comply with all the rules governing the competition.

In a district in which there is a school fair or a boys' and girls' club fair, the prizes shall be offered at such fair unless in the opinion of the managers of the banks in the district (to be ascertained by the bank earliest established in the district) the prizes should preferably be offered at the agricultural fair.

RULES.

1. Only boys and girls who have not attained their 17th birthday before the opening day of the show are eligible to compete in the Canadian Bankers' Competition.

2. No entry fee will be charged.

3. No exhibitor shall be allowed to make more than one entry in a class.

4. Not more than one member of a family shall be allowed to compete in a class.

5. An exhibitor who wins a cash prize at one fair shall not be allowed to compete in the same class at another fair.

6. Calves and pigs entered for competition must have been born on or after March 15, 1918, and must be the property of the exhibitor or the exhibitor's parent or guardian.

7. Grade bull calves, and grade boars are not eligible to compete, and entries for same must not be accepted.

8. In districts where beef cattle predominate the branch managers of the banks in the fair district shall, with the Secretary of the fair, before applications are received, decide that the prizes shall be given to calves of beef type; and in districts where dairying stock predominates they shall decide, before applications are received, that the prizes shall be given for calves of dairy type. If the management of the fair desires that there should be prizes for the type not selected it is suggested that the additional prizes be arranged for locally.

9. Exhibitors must feed and care for the animals they exhibit for at least six weeks. Whether in the case of calves the calf is fed from a pail or not makes no difference.

10. An application form and a certificate form are attached hereto.

(a) The application form must be properly filled out and filed with the manager of a local bank branch at least three weeks before the date of the fair.

(b) The certificate must be filled out and signed by the parent or guardian of the exhibitor, and filed with the Secretary of the Fair not later than the day of the competition. If, however, an exhibitor fails to present his certificate on the day of the competition, he shall be allowed to compete, but any prize he may win shall be withheld until a properly filled and signed certificate is produced, and said certificate must be forthcoming within forty-eight hours after the holding of the competition, otherwise his prize money shall be forfeited.

11. In case the winner of a prize is subsequently disqualified, each exhibitor below him shall be moved up one place.

12. The competition is divided into two classes: Class I for Calves, pure bred and grade and Class II for pigs, pure bred and grade in pairs. The prizes in each class range from five dollars for first prize to one dollar for fifth prize and a sixth reserve ribbon.

PART IV

Special Contributions, Reports of Agricultural Organizations, Publications, and Notes.

AGRICULTURAL RELIEF TO THE ALLIES

As a result of the appeal to the agricultural organizations of Canada by the Canadian Branch of the British Empire Agricultural Relief of the Allies Fund, a sum aggregating \$23,500 has been secured. At a meeting of the local committee held in Ottawa on April 14, a letter was read from Dr. James W. Robertson, chairman of the committee, suggesting that the money be used in the purchase of garden sets and other small tools, to be distributed to farmers whose homes have been devastated

and property destroyed in Serbia, Belgium, Roumania, and France. After learning from manufacturers of the particular style of tools exported to these countries, it was decided to make up one thousand sets for each of the four countries named. These include hay forks, manure forks, hoes, garden rakes, spades, sickles, hatchets, and hand saws. These have been shipped to the headquarters of the British Empire Relief Committee to be distributed.

THE SMITH-LEVER EXTENSION BILL

Secretary Houston of the United States Department of Agriculture, in answering a torrespondent, brings out interesting information relative to the Smith-Lever Extension Bill which serves in the United States much the same purpose as The Agricultural Instruction Act serves in Canada.

"Co-operative extension work in agriculture and home economics in the United States has been carried on under the provisions of the act of Congress of May 8, 1914, known as the Smith-Lever Extension Act. The funds appropriated under this act have been supplemented by direct appropriations for farmers' co-operative demonstration work, and during the past two years by war emergency appropriations under the food production act. The funds available for this work during the current fiscal year are as follows. —

FEDERAL FUNDS.

Under the Smith-Lever Act	\$ 2,580,000
For farmers' co-operative demonstration work	1,204,940
Under the food production act	6,100,000
Total	\$ 9,884,940

STATE FUNDS.

Under the Smith-Lever Act	2,100,000
Miscellaneous	4,000,000
Total	\$ 6,100,000
Total available amount	\$15,984,940

"The State funds are contributed by the legislatures, counties, farm bureaux, and other local organizations and individuals within the States.

"These funds are used for the employment of county agricultural agents, home demonstration agents, boys' and girls' club leaders, and specialists in various branches of agriculture and home economics, and the necessary administrative officers. At present about 2,400 counties have agricultural agents and 1,400 counties have home demonstration agents. The people on fully half the farms of the country were reached by these agents last year and given practical instruction and advice regarding agriculture and household matters. About 2,000,000 boys and girls were organized in clubs for the growing of plants or animals, canning, or otherwise preserving the products of the farm and gardens, etc. Garden work was also done in many cities, and home demonstration agents worked in about 200 cities.

ASSOCIATIONS AND SOCIETIES

EVENTS OF THE MONTH

June 3—Annual Meeting of the Interior Stock Raisers' Association of British Columbia, Kamloops; Secretary, S. C. Burton, P.O. Box 20, Kamloops, B.C.

June 15—Annual meeting of the Alberta Veterinary Association, Calgary;

Secretary, T. E. LeClaire, V.S., 1106th Ave., East, Calgary.

June 29—Annual meeting of the Saskatchewan Homemakers' Clubs, Saskatoon; Secretary, Miss Abbie DeLury, Director, Homemakers' Clubs, University of Saskatchewan, Saskatoon, Sask.

THE INTERNATIONAL ASSOCIATION OF POULTRY INSTRUCTORS AND INVESTIGATORS

A meeting of the International Poultry Instructors and Investigators was held in London on March 14. There were present representatives from England, Ireland, Scotland, Canada, Holland, and France. This is the first meeting of the congress since July, 1912, when steps were taken to arrange for the first world's poultry congress, which, on account of the war, has not taken place. The object of the present meeting was to consider and devise means for the restoration of the poultry industry, especially in the instructional and investigational sides. The representatives from Canada included Mr. H. S. Arkell, Live Stock Commissioner, Mr. W. A. Brown, Chief of the Poultry Division of the Live Stock Branch, and Capt.

J. A. Clark, Superintendent of the Experimental Station at Charlottetown, temporarily attached to the Khaki University.

Among the resolutions passed the following main points were emphasized: Urging the adoption of international standards for eggs and poultry; increased international consumption of eggs and poultry, particularly eggs; increased government recognition and support of the poultry industry; increased utilization of women's institutes as a means of furthering the poultry industry. It was decided to hold the first world's poultry congress at the Hague in 1921. The President of the Council is Mr. Edward Brown, F.L.S., London.

NATIONAL SOIL PRODUCTS EXHIBITION

Arrangements are well advanced for the holding of the National Soil Products Exhibition, of Manitoba in 1920. Plans are announced by the Extension Service of the Department of Agriculture. The exhibition will be held from February 14 to 28 and will occupy 15,000 sq. ft. of floor space in

the Board of Trade convention hall. An important feature will be the provision for the sale of seed, actual samples of which will be exhibited and will include grain and potatoes. A section of the exhibition will be devoted to collective exhibits of grains shown by Boys' and Girls Clubs.

CANADIAN NATIONAL LIVE STOCK COUNCIL

The executives of the Eastern Canada and Western Canada Live Stock Unions held a meeting in Ottawa early in May to reorganize the Canadian National Live Stock Council. A new constitution was agreed upon by the delegates. This has been accepted by the Eastern Canada Live Stock Union through their delegates but has still to be approved by the Western Union.

The object shall be to promote in every legitimate way the live stock industry of Canada through joint action of the Eastern Canada and Western Canada Live Stock Unions, when joint action appears to be desirable or necessary. The head office of the Council shall be in the city of Ottawa.

The Council shall consist of twelve regular official representatives, six from the Eastern Canada Live Stock Union and six from the Western Canada Live Stock Union. The regular official representatives shall

be the executive committees of each union, (not to exceed six from each).

Special representatives may be appointed by the president of a Union, to be authorized to act for one or more meetings as specified, (a) in order that specially qualified representation may be obtained to deal with special subjects, (b) to provide full representation if one or more regular official representatives are unable to be present, provided that in no case shall more than one-half of the representation at any meeting consist of special representatives.

The following officers were elected: President, Dr. S. F. Tolmie, M.P., Victoria; vice president, John Gardhouse, Weston, Ont.; provisional secretary, E. L. Richardson, Calgary; the executive for the Eastern Union: John Gardhouse, Weston, Ont.; H. D. Smith, Hamilton, Ont.; R. R. Ness, Howick, Que.; J. E. Prethour, Burford,

Ont.; F. L. Fuller, Truro, N.S.; Geo. Pepper, Toronto; and for the Western Union: Dr. S. F. Tolmie, A. D. Paterson, Delta, B.C.; Geo. Hoadley, M.P.P., Okotoks, Alta.; Andrew Graham, Pomeroy, Man.; F. H. Auld, Deputy Minister of Agriculture, Regina, and E. L. Richardson, Calgary.

It is the purpose of the Union to appoint a permanent secretary who will give his full time to live stock problems such as production, transportation, and marketing. Through this officer the Union will co-operate

with the various live stock and record associations in Canada.

The Union is looking to the federal Department of Agriculture for a grant to be supplemented with such financial assistance as is necessary from the Eastern Canada and Western Canada Live Stock Unions to carry on the work during the first few years and until fees and memberships shall be forthcoming from the live stock organizations as go to make up the Eastern Canada and Western Canada Live Stock Unions.

QUEBEC SOCIETY FOR THE PROTECTION OF PLANTS

The annual meeting of the Quebec Society for the Protection of Plants was held on April 2 at Macdonald College.

The following officers were elected: President, Prof. W. Loshhead, Macdonald

College; vice-president, Rev. Brother Leopold, La Trappe, Oka; secretary-treasurer, J. M. Swaine, Entomological Branch, Department of Agriculture, Ottawa.

GUELPH BIRD HOUSE COMPETITION

BY R. S. CULL, SECRETARY, BIRD HOUSE COMMITTEE

The third annual bird house competition of the Guelph Horticultural Society was held in the city of Guelph on April first. The judging was done by Professor J. W. Crow of the Ontario Agricultural College who is a member of the bird house committee. The competition consisted of houses for martins, wrens and chickadees, nuthatches and swallows, flickers, robins, and phoebes, feeding shelves, and note books on bird observation. After the awards were made the exhibition was thrown open to the public. The prizes offered were for martin houses and note book, three, two and one dollars and for the other classes two dollars, one dollar and fifty cents, and one dollar. The note book was expected to contain a record of the dates of the arrival of birds from the south, the number seen, the date when they became common, dates of nesting, egg laying, leaving of the nest by the young, description of songs, and other interesting observations in connection with bird life. Following are the dimensions and suitable locations for the different kind of houses:

Blue bird, nut hatch and tree swallow houses: For tree swallow and bluebird inside diameter 6 inches square or round; inside diameter for nuthatch 4 inches; in both cases 8 inches to 10 inches deep, opening 2 inches, not less than 6 inches from the bottom. These houses can be placed 5 feet to 10 feet from the ground.

Martin houses:—Several compartments, 8 or more, each 7 inches square, entrance

hole $2\frac{1}{2}$ inches square or round, near or at the bottom of each compartment.

Wren and chickadee houses:—Inside diameter 4 inches, square or round, 6 to 8 inches deep, opening $1\frac{1}{2}$ inches near the top. Houses to be placed 6 to 10 feet from the ground.

Flickers:—Diameter inside 8 inches square or round, 14 to 16 inches deep, opening 3 inches near the top, sawdust in the bottom is important; to be placed 12 feet to 20 feet from the ground.

Robin shelters:—8 inches by 8 inches by 6 inches high, one or more sides open; to be placed 10 to 15 feet from the ground.

Phoebe shelters:—6 inches by 6 inches by 6 inches high; one or more sides open, to be placed 8 to 12 feet from the ground.

Since the bird house competitions were started the birds have greatly increased in the Guelph district and have become quite tame. It is rare that one hears of birds' nests being robbed or a bird stoned by a boy. It would be well if bird study were made a part of the public school curriculum as it would give the boys and girls a deeper interest in birds. Last year twelve houses put up near a fishing resort were all occupied by wrens, bluebirds, tree swallows and flickers. While the Baltimore oriole does not occupy a bird house, by a little attention paid to their needs they can be readily attracted. On one day twenty-three of these beautiful birds were counted on an island of half an acre. String and horse hair scattered about the island had no doubt much to do with attracting them to the place.

UNITED FARMERS OF ALBERTA SUNDAY

The United Farmers of Alberta have set apart June 15th as United Farmers of Alberta Sunday. The object is to discuss the United Farmers of Alberta from a religious standpoint and to discuss religion from the standpoint of the United Farmers of Alberta. To this end the officers and members of the organization are urged to take counsel among themselves as to how best they may:

1st. Unify and inspire the local community

for its fullest self-consciousness and its most efficient activity.

2nd. Enlist the sympathetic co-operation of all the best elements, the finest moral spirit, the best trained intellect in the community for the cause.

3rd. Promote the education of the people, and especially the youth, in the principles and the spirit of democratic citizenship.

4th. Encourage the development of effective community workers and leaders.

BRITISH COLUMBIA GOAT BREEDERS' ASSOCIATION

The second annual meeting of the British Columbia Goat Breeders' Association was held in Vancouver. Many milch goats have been brought into the province and now number upwards of 3,000. The membership of the association is about 250. The society is looking forward to the commencement of

Record of Performance work with milch goats.

The following officers were elected: President, G. H. S. Cowell, Port Alberni; vice-president, W. H. Cottrell, Vancouver; secretary-treasurer, George Pilmer, Victoria.

BRITISH COLUMBIA STOCK BREEDERS ASSOCIATION

At the annual meeting of the British Columbia Stock Breeders' Association Mr. A. D. Paterson, Delta, was elected president;

Mr. Mytton, Kamloops, vice-president and Mr. Geo. Hay, District Agriculturist at Kamloops, secretary.

NEW PUBLICATIONS

DOMINION DEPARTMENT OF AGRICULTURE

EXPERIMENTAL FARMS

The Cultivation of Some Staple Vegetables—is the title of Pamphlet No. 27, prepared by Mr. W. Saxby Blair, Superintendent of the Experimental Station, Kentville, N.S. It furnishes such general information on vegetable growing as should aid in successful gardening.

D.Sc., Dominion Chemist, contains information as to the nature, composition and nutritive qualities of the more important feeds found on the market.

The Rod Cultivator.—Pamphlet No. 28 by W. H. Fairfield, superintendent of the Experimental Station at Lethbridge, Alberta, describes a new style of cultivator that destroys weeds without pulverizing the surface and consequently reduces soil drifting. A rod of five eighths of an inch diameter passes through the soil sideways about three inches below the surface. The implement is fully described and its construction explained and illustrated.

LIVE STOCK BRANCH

Value of Castration and Docking.—Pamphlet No. 16 of the Sheep and Goat Division of the Live Stock Branch, describes briefly the value of castration and docking for lambs, with illustrations.

PROVINCIAL DEPARTMENTS OF AGRICULTURE

NEW BRUNSWICK

Annual Report of the Department of Agriculture.—The report for the year ending March 31 October, 1918, includes a summary

Every Gardener His Own Seed Grower.—Circular No. 17, by W. T. Macoun, Dominion Horticulturist, constitutes a continuation, designated Part II, of a study in the growing of seed of garden crops. While Part I dealt with biennial vegetable crops, Part II takes up beans, corn, cucumbers, lettuce, peas, tomatoes, and similar kitchen garden crops.

Bean Anthracnose.—Pamphlet No. 25 describes bean anthracnose, gives its cause, history and control measures.

Farm Feeds.—Bulletin No. 36, Second Series, entitled "Farm Feeds, Grains, Mill Feeds and Concentrates, Their Nature and Composition" by Frank T. Shutt, M.A.,

of the agricultural prospects of the province as well as reports from the heads of the various divisions who have outlined their work for the year.

Elementary Agricultural Education—The annual report of Mr. R. P. Steeves, Director of Elementary Agricultural Education in New Brunswick, for the year ending 31st October, 1918, deals with school gardening, poultry project work, school fairs, and rural science schools.

PRINCE EDWARD ISLAND

The Annual Report of the Department of Agriculture for 1918—devotes a considerable portion of space to agricultural instruction carried out through the Prince of Wales College and the public schools. It also deals with the work of the live stock, dairying, and field crops branches of the department.

QUEBEC

In *The Greater Production Service in 1918*, a supplement to the Report of the Minister of Agriculture, Mr. A. T. Charron, Director of the Greater Production Service in 1918, reviews the methods and accomplishments of the service.

Competition of Agricultural Merit.—The report of the judges in the competition of the 1918 agricultural merit describes the farms and products of many of the 54 farms examined. It is issued as a supplement to the *75th* Report of the Minister of Agriculture.

ONTARIO

Home Pasteurization of Milk—Circular No. 16, constitutes a four-page pamphlet prepared by Mr. D. H. Jones, Professor of Bacteriology at the Ontario Agricultural College, and deals with the reasons why milk should be pasteurized, more especially for infant feeding, and the methods by which pasteurization may be done in the home.

Farm Crops—Bulletin No. 268, contains the results of experiments in farm crops carried on at the Ontario Agricultural College in 1918 by Dr. C. A. Zavitz, Professor of Field Husbandry and Director of Field Experiments.

Hay and Pasture Crops, Bulletin 269, Ontario Agricultural College, by Dr. C. A. Zavitz, Professor of Field Husbandry, and W. J. Squirrel, describes twenty-six varieties of grasses, clovers, and similar crops grown in Ontario and shows representations of the plants.

Agricultural Calendar—A wall calendar commencing with the month of March this year and running for twenty-four months, with three months on a sheet, contains seasonable farming suggestions for each month.

Circular No. 17 of the Ontario Department of Agriculture constitutes a list of women's institute meetings and of the speakers that will address them at a series of meetings to be held in the different parts of the province during the months of May, June, and July.

Fire Prevention on the Farm and Elsewhere—is the title of a bulletin issued by the Ontario Fire Marshal for the guidance of men, women, and children in preventing the occurrence of destructive fires. A section is devoted to lightning rods, their efficiency, and installation.

Agricultural Societies.—The appendix to the Annual Report of the Agricultural Societies of Ontario for 1918 contains the results of competitions in standing field crops and prize winning grain at winter fairs, the Canadian National, and Central Canada Exhibitions.

Women's Institutes.—Part I of the Report of the Women's Institutes of Ontario for 1917 contains the reports of the Eastern Ontario, Western Ontario, and Central Ontario conventions held in 1917, and statistical tables concerning women's institutes in the province.

BRITISH COLUMBIA.

Directory of Poultry Breeders.—Bulletin No. 8 of the British Columbia Poultry Association contains a list of the breeders of practically every breed of poultry kept in the province. It also gives a list of the winning birds at the British Columbia Poultry Show held at Vancouver in January this year.

MISCELLANEOUS

Proceedings of the Veterinary Association of Manitoba.—Constitutes the report of the annual meeting held at Winnipeg in February 1919.

The Sugar Beet in America.—In a volume of 340 pages the Director and Agronomist of Utah Agricultural Experiment Station has set down the results of long and special study on the sugar beet as it is grown in the United States. The physiology of the plant, soils, climate, fertilizers, place in the rotation, cultivation, harvesting, disease, etc., occupies the major portion of the book. The work

which is edited by Professor L. H. Bailey, belongs to the Rural Science series of publications published by the MacMillan Company of Toronto.

Holstein Friesian Herd Book.—Volume 22 of the Holstein Friesian Herd Book of Canada contains the pedigrees of bulls numbered from 33526 to 37850, and of cows from 54151 to 62875. The book also contains the annual report of the Holstein Friesian Association of Canada for 1918 and the milk and butter records of animals admitted in the Record of Performance and Record of Merit.

Housewifery is the title of a manual and text book of practical housekeeping by Lydia Ray Balderston, A.M., and published by J. B. Lippincott & Co., Philadelphia. The volume is the outgrowth of years of experience in housekeeping and in teaching housewifery to groups of practical housekeepers. It deals with plumbing, heating, labour-saving appliances, supplies and furnishings, cleaning and renovating, and other phases of housekeeping.

The Canadian Fertilizer. The Biggar Press, Limited, of Toronto, have issued the first number of the monthly journal "The Canadian Fertilizer" that is to be devoted to soil betterment, improved cultivation, and the treatment of plant diseases throughout Canada. The first number has exhaustive articles on "Nitrogen in War and Peace", "The Production and Use of Fertilizers in British Columbia", "Lime and Sulphur the

great Renovator of Orchards", and "Nitrate of Soda, Its nature and use in America".

The Gary Public Schools.—Science teaching in the Gary Public Schools at Gary, Indiana, is reviewed by Otis W. Caldwell in a publication issued by the General Education Board of New York State. The volume constitutes twelve chapters dealing with the various phases of the work including among others, nature study, garden work, staff and instruction in nature study, botany and gardening, and zoology.

The Fairview Idea.—The author, Herbert Quick, has succeeded his "Brown Mouse" by "The Fairview Idea" which relates the experience of the Fairview district in discovering its weakness as a rural community and adopting modern ideas in developing a truly rural atmosphere. In his introduction the author gives the purpose of the book as an effort to restore the rural morale. The book is published by the Bobs-Merrill Company, Indianapolis.

The War Garden Victorious.—is the title of a comprehensive volume by Charles Lathrop Pack who dedicates the work to the war gardeners of the United States and Allied countries in admiration of their success in adding to the world's supply of food during the world war. It describes the war garden movement in the United States and contains, as an appendix, reprints of instructive pamphlets on producing, storing, and preserving garden crops.

NOTES

A farm boy's and girls' congress will be held at the Alberta University on June 23rd to 28th. It is being organized by the Extension Department of the College of Agriculture.

Mr. D'Arcy Scott, for ten years a member of the Railway Commission and who is now practising law in Ottawa, has been appointed secretary of the National Dairy Council.

Sixteen thousand cattle have been put out among the homesteaders in the province of Alberta that were purchased with money borrowed under the Provincial Live Stock Encouragement Act.

Some of the schools in Dundas County, Ontario, have taken a progressive step in the beautification of their school grounds. One school in particular has been supplied with trees, plants, and shrubs, which were set out on Arbour Day.

One of the benefits of the organization of a calf club in the county of Grenville is that the agricultural representative has been able to interest nearly all of the members of the club in milk testing.

Professor R. B. Cooley, '10 Ontario Agricultural College, who has spent six years as head of the Department of Animal Husbandry and extension work in Rhode Island, has accepted the position of director of live stock extension work at the Massachusetts Agricultural College.

The Canadian Pacific Railway Company has issued its instructions to divisional superintendents, in a number of western divisions, requesting them to co-operate with the provincial weed inspectors in destroying noxious weeds, more especially the sow thistle, along the right of way of the railway company.

Mr. E. Ward Jones, the markets representative of the Live Stock Branch of the Department of Agriculture of Canada at Calgary, has resigned his position to accept the management of the Alberta Stock Yards in Calgary. Mr. Jones succeeds Mr. Edward Evans, who has been appointed manager of the new Moosejaw Co-operative Stock Yards.

Dr. David Warnock, Deputy Minister of Agriculture of British Columbia has issued an appeal to the residents of the towns and

cities in British Columbia urging the continuation of the cultivation of land within the city limits. By thus raising food crops, Dr. Warnock urges, the cost of living will be reduced which will have an immediate bearing on the work of reconstruction.

Arrangements have been made between the Soldiers Settlement Board of Canada and the Department of Agriculture of Ontario whereby the agricultural representatives will act as agents in connection with the settling of soldiers on the land. Assistance will be given especially in placing settlers with farmers for training and also in assisting in the supervision of settlers after they are established on their own farms.

The agricultural representative for Simcoe County reports that 4,209 trees secured from the Ontario Forestry Branch were planted in the school yard at Nottawa. The object of the planting is, first, to demonstrate what can be done in forestry and, secondly, in order to educate the children in the planting of trees. The planting was done by the school trustees and other men.

The Manitoba Department of Agriculture is offering a bounty for the destruction of crows. The rate is ten cents for each pair of crow's legs and five cents for each crow's egg. These may either be turned in to the secretary of the municipality or sent direct to the Agricultural Extension Service, Legislative Building, Winnipeg. Encouragement for the destruction of crows is in response to a popular demand from poultry farmers, sportsmen, and lovers of wild life.

Mr. William C. Blackwood, Director of Physics at the Toronto Technical school, has been appointed Professor of Physics at the Ontario Agricultural College in succession to W. H. Day, who resigned a short time ago. Mr. Blackwood was raised in Harriston in Wellington county, and after going through the High School there, taught school in the rural sections. Later he took a course at the School of Practical Science in connection with Toronto University, and upon graduating held a position as Demonstrator in Physics for a few years. About ten years ago he was appointed as a teacher in electrical and mechanical engineering at the Technical School, and for the past four years he has been Director of the Department of Physics. He is very highly regarded by those with whom he has come in contact.

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What Size Tractor Shall I Buy? Professor J. McGregor Smith, Saskatchewan University, page 40.

The Farm and Ranch Review and the Country Home, Calgary, Alta., April 21.

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Vigorous Seed Potatoes for Better Yields. W. T. Macoun, Dominion Horticulturist, page 503.

The Journal of Agriculture and Horticulture, Quebec, Que., May 1.

The Cost of Milk Production in the District of Montreal. H. Barton, Professor of Animal Husbandry, Macdonald College, page 199.

Littlebury's Magazine, Calgary, Alta., April and May.

Canadian Prairie Hawks and Agriculture. P. A. Taverner, Geological Survey, Mines Department, Ottawa, page 16.

Macdonald College Magazine, Macdonald College, Que., Dec. and Jan., 1918-1919.

A National Agricultural Educational System. M. A. Jull, B.S.A., page 91.

A Historical Sketch of Quebec Agriculture. James Murray, B.S.A., Professor of Cereal Husbandry, page 96.

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Canada as a Producer and Consumer. F. C. Elford, Dominion Poultry Husbandman, Ottawa, Ont., page 115.

The Maritime Farmer and Co-operative Dairy-men, Sussex, N.B., May 6.

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The Saskatchewan Farmer, Moosejaw, Sask., March.

The Value of Recleaned Screenings. W. C. McKillican, page 17.

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Rural Clubs for Boys and Girls. Irene Parlbay, President of the United Farm Women of Alberta, page 36.

PART V

The International Institute of Agriculture

FOREIGN AGRICULTURAL INTELLIGENCE

All communications in regard to this section should be addressed to T. K. Doherty, International Institute Commissioner, Department of Agriculture, West Block, Ottawa.

SCIENCE AND PRACTICE OF AGRICULTURE

GENERAL INFORMATION

1324—High Council of Agricultural Stations and Laboratories in France.—*Journal Officiel de la Republique Francaise*, p. 7280. Paris, August, 16-17, 1918.

An order of the Minister of Agriculture, dated August 12, 1918, constituted a High Council of Agricultural Stations and Laboratories composed of 25 members, 9 of which are elected by the "Academie des Sciences," 6 by the High Council from competent persons of note, and finally 4, representing the Minister of Agriculture, are named by him. The members are appointed for 3 years and one-third will be re-elected each year; they are eligible for re-election. The General Inspector of Agricultural Laboratories will be present at the meetings for purposes of consultation. The Council has to watch over the working of the Agricultural Stations and Laboratories, to guide and direct them in the path assigned to them so as to make them as highly useful as is possible. It treats with all questions relating to scientific researches to be undertaken and to be carried on in those establishments.

CROPS AND CULTIVATION

1326—The Question of Hail-rods and Storms in the Gironde, France, in 1918.—ANGOT, A., in the *Comptes rendus de l'Academie, d'Agriculture de France*, pp. 838-840. Paris October 9, 1918.

M. ANGOT has presented to the Academy a study, by M. COURT, astronomer to the Bordeaux Observatory, on the storms observed in 1917 in the Gironde and part of Dordogne, a region furnished with a large number of hail-rods ("niagaras electriques").

In his report M. COURT gives a table showing the localities where hail-rods have been installed and the number of times that hail fell in these localities during the 6 years 1911-1917. In two localities the observations ended in 1916 at the same time as the Municipal Council requested the prefect to order the removal of the hail-rod as they blamed it for the frequency with which hail had fallen since the hail-rod had been set up.

On the contrary, in two other localities no hail was observed during the six years.

M. COURT simply gives the facts observed, without drawing conclusions, while expressing the wish that these observations should be continued. In fact, the irregular appearance of hail throws doubt on any conclusions that might be drawn from a small number of observations.

M. ANGOT supports M. COURT's wish, as the results will be all the more searching as the period of observation is longer. The 5 years of observations made by the author of the study tend to confirm M. ANGOT's previous opinion: that hail-rods have no influence whatever on hail."

14—Potassium Requirements of Bacteria.—KOCH, G. P., in *Soil Science*, Vol. V., No. 3, pp. 219-224. Baltimore 1918.

It has been demonstrated that potassium is one of the essential mineral cations for nitrogen-fixing bacteria. The author made experiments to ascertain how much potassium micro-organisms require in order to carry on their life processes.

In his experiments the author used cultures of peptone added to different salt solutions and studied them in comparison with cultures of solutions without potassium sulphate and cultures in peptone only.

The results of the experiments show that potassium is necessary to the development and activities of *Bacillus subtilis*. If sufficient potassium for micro-organisms is not present, magnesium sulphate and calcium phosphate will not influence the activities of *Bacillus subtilis*. Supplying 0.24 mgm. of K₂O in addition to 0.1 mgm. already supplied in the dialized peptone in 100cc solution, furnished sufficient potassium for the maximum development and activity of *Bacillus subtilis*. Applying 2½ or 5 times this amount of potash did not increase the activity of the bacteria over that produced by 0.24 mgm. By keeping the salts in the same proportion, the total concentration of a 3-salt solution can be reduced from 0.10 to 0.09 atmosphere

without influencing the extent of ammonia formation from dialized peptone by *bacillus subtilis*.

15—The Non-Persistence of Bacterio-Toxins in the Soil.—HUTCHINSON, H. B., and THAYSEN, A. C., in *The Journal of Agricultural Science*, Vol. IX, No. 1, pp. 43-62, Cambridge, 1918.

Since the soil is the abode of a considerable bacterial population and the seat of innumerable bacterial changes, it might be supposed that bacterial toxins would occur there. It is of fundamental importance to soil bacteriology to settle this point and to discover whether there is any evidence that such toxins exist, for any depression of cell growth owing to their presence must obviously be reflected in a limitation of plant food production.

During the past seven years several experimenters claim to have obtained evidence of the existence of bacterio-toxins in the soil. The results obtained from experiments showed that when a culture of *Bacillus prodigiosus*, was brought into an untreated saline extract of soil, there ensued a marked reduction in the number of cells remaining alive after 24 hours, while a similar culture was capable of appreciable growth when carried into a like extract but which had been previously subjected to heat. The method used in the experiments is open to several objections: the test organism is not a common inhabitant of the soil and the results obtained by its use do not necessarily apply to the typical soil flora; the assumption is made that all substances in the extract which exert an unfavourable influence on the test organism must necessarily be bacterio-toxins.

Seven English soils were examined by the authors, who state that:

(1) The untreated extracts of these soils varied largely in their suitability for the growth of the test organism (*B. prodigiosus*).

(2) Treatment of the extracts by heat (which was supposed to result in the destruction of toxins) invariably led to still further bacterial decreases.

(3) Extracts of soils treated with anti-septics (which are not supposed to destroy toxins) were on the whole more favourable for growth than those of untreated soils.

(4) Although it is possible, under well defined conditions, to induce the formation of bacterio-toxins in culture solutions, there is no evidence to show that these are likely to possess importance in the phenomena of partial sterilization of the soil.

1335—Nitrogen Fixation in Manure.—I, TOTTINGHAM, W. E., The Increase of Nitrogen in Fermenting Manures, in *The Journal of Biological Chemistry*, Vol. XXIV, No. 3, pp. 221-225. Baltimore, 1916.—II, FULMER, H. L., and FRED, E. B., Nitrogen-Assimilating Organisms in Manure, in the *Journal of Bacteriology*, Vol. II, No. 4, pp. 423-434. Baltimore, 1917.

I.—Various investigations (lasting from two to several months) on fermenting manure have nearly always shown more or less considerable loss in nitrogen; an increase in nitrogen has but rarely been observed. During recent work on the changes in a fermenting mixture of cow and horse manure an increase in nitrogen was observed after two and four weeks. This increase was followed by so large a decrease that after twelve weeks the loss in nitrogen was complete. The increase in the nitrogen content is much greater in straw-littered than in unlittered manure.

This fixation phenomenon was confirmed by laboratory control tests. The manure mixture was kept either in covered galvanized iron pails or inoculated with mannite or other solutions. The results showed manure to contain nitrogen-fixing bacteria of considerable activity, especially when mixed with straw, which appears to be an important source of energy for these micro-organisms. It is obvious that the increase of nitrogen in manure at the beginning of fermentation may prove of practical value in manuring soil if this increase is not counter-balanced by a simultaneous loss in organic matter. Experiments with straw-littered manure (gathered fresh and placed in covered boxes out of doors during the winter months so as to limit fermentation) applied to a rotation of maize, barley and clover, showed such manure to increase the yield in maize grain by 5.3 per cent and the yield in maize stover by 7.4 per cent, as compared with fresh manure with straw. This difference disappeared with barley and was reversed with clover. The result of these experiments, which lasted six years, were in favour of limited fixation of manure if the nitrogen so fixed can be utilized at the time of application.

II.—Later experiments made with liquid and solid cultures showed nitrogen fixation in fermenting manure to be due to certain forms of bacteria which appear to belong to different groups. The chief agent of nitrogen fixation in manure, however, seems to be *Bacterium azophile* n. sp., present in large numbers in fermenting manure. The increase in nitrogen when this bacterium is grown on manure extract is from 3 to 5 mg. per 100 cc. of solution. The optimum temperature for the development of nitrogen fixing bacteria in manure appears to be 28°C. *Bact. azophile* seems to be widely distributed in nature.

23—Twenty Years' Work on the Availability of Nitrogen in Nitrate of Soda, Ammonium Sulphate, Dried Blood and Farm Manures.—LIPMAN, J. G., and BLAIR, A. W., in *Soil Science*, Vol. V, No. 4, pp. 291-300. Baltimore.

The question of availability of nitrogenous fertilizers has received the serious consideration of the leading European experiment stations for over thirty years. About twenty years ago the subject began to receive

attention in the United States where the results are fairly in accord with the findings of the European investigators.

The authors describe a series of experiments covering 20 years, carried out by means of 5 year rotations in galvanized cylinders open at both ends and having a diameter of 23½ inches and a depth of 4 feet. These cylinders were set in the ground so that about 2 inches remained above the ground level. The subsoil used was a gravelly sandy material, and the top soil a loam. When the work was begun the soils were given a liberal treatment of lime, in the form of ground limestone and received annual dressings of superphosphate and potassium chloride at the rate of 640 pounds and 320 pounds per acre, respectively. The first rotation, begun in 1898, included (1) corn, (2) oats or millet, (3) oats or corn, (4) wheat, (5) timothy. The second rotation begun in 1903, consisted of the same crops, except that the oats were in some cases replaced by corn. The third was like the second, except that oats and rye were grown together in place of wheat. The fourth rotation was the same as the second. Nitrogenous materials were applied for each main crop in the rotation as follows: cylinder 4B farm manure at the rate of 16 tons per acre, cylinder 8B nitrate of soda at the rate of 320 pounds per acre, cylinder 17B ammonium sulphate equivalent to 320 pounds of nitrate of soda per acre, cylinder 18B dried blood equivalent to 320 pounds of nitrate of soda per acre.

Conclusions.—Crop yields were better maintained over a period of 20 years with nitrate of soda than with an equivalent amount of ammonium sulphate or dried blood. For several years the latter gave results about on a par with the nitrate but an average of the second 10 year period shows a considerable falling off with these materials. The percentage of nitrogen recovered in the crop was greater with the nitrate than with any of the other materials.

The work shows that when properly used nitrate of soda alone as a source of nitrogen may be depended upon to maintain crop yields over a long period, and that a given amount of nitrogen in this form is more effective than an equivalent amount in the form of ammonium sulphate, or organic materials. Its effect is to produce larger crops per unit of nitrogen, and these crops, in turn, leave behind in the soil larger crop residues, and with carbonate of lime to aid in their decomposition these furnish a sufficient supply of organic matter to keep the soil in good physical condition.

1209—Analysis of Phosphatic Fertilizers,—

I. MASONI, G., Contribution to the Study of the Adulteration of Bone Superphosphates, in *R. Università di Pisa, Istituto di Chimica agraria, Studi e Ricerche*, Pt. 22 (1909-1914), pp. 139-170. Modena, 1917.—II. QUARTA-ROLI, A. and ROGAI, A.

On the Use of Ammonium Citrate in the Determination of Phosphoric Acid. *Ibid.*, pp. 427-443.

I.—As bone superphosphates have a higher commercial value than other phosphatic fertilizers they are naturally more subject to adulteration. The author proposes a simple method to determine such adulteration which, though not general, gives useful and sometimes decisive results.

PRELIMINARY TESTS.—A little of the substance is carefully charred in a porcelain dish then calcined in a platinum dish which is removed now and again from the flame. Pure bone superphosphate gives off no white steam. When, after prolonged calcination, the substance is still incandescent, pure bone superphosphate should not give a deep yellow colour which subsequently disappears, but should remain whitish or, at the most, yellowish. After cooling the calcined residue should remain white or have a pale reddish tinge. It is completely soluble in warm 10% hydrochloric acid or, should a very small part remain undissolved, the solution should become perfectly clear after standing a little while.

QUANTITATIVE AND QUALITATIVE TESTS.—The moisture, total P_2O_5 , water and citrate soluble P_2O_5 , total SO_3 , and residue insoluble in aqua regia are determined. Reducing the results to a dry matter basis at 100°C the values are:— $ST = \frac{\text{total } SO_3}{\text{total } P_2O_5} \times 100$

and $SS = \frac{\text{total } P_2O_5}{\text{soluble } P_2O_5} \times 100$. In good

bone superphosphate these values should not exceed 130 and the difference $ST - SS$ should not be great. If the values of SS and ST are much below the minimum of 110 the purity of the product is doubtful and precipitated phosphates have probably been added. A percentage of 1.3 for the residue insoluble in aqua regia is already high.

In some doubtful cases the following *summary tests* may be useful:—see whether the aqueous solution gives a strong reaction to chlorine (precipitated phosphates); observe with a magnifying glass whether the water-insoluble residue contains carbon particles (ashes, etc.); test whether the superphosphate effervesces with acids; in special cases determine the pyro-phosphoric acid (large quantities show the presence of pyrophosphates or super-phosphates derived from them).

II.—The author studies the value of determining phosphoric acid in superphosphates and basic slags by the ammonium citrate instead of the molybdate method. It was shown that, in the case of basic slag, the citrate method may sometimes lead to serious errors, although there are two sources of error which often tend to balance each other—precipitation of magnesium ferrites or citroferrites and incomplete precipitation of phosphoric acid. If the results disagree and the precipitates are

not perfectly white and amorphous after calcination, it is possible, by estimating the iron, to determine whether errors are due to its presence. If such a case, elimination of the iron before precipitation by means of "cupferron" (ammoniacal salt of nitroso-ferri-hydroxylamine) might give reliable results. Nevertheless, this method is not generally applicable, in practice, to commercial analyses.

In the rarer cases, where iron or aluminium phosphates are concerned, the citrate method is not applicable. The principle consisting in precipitating phosphoric acid in the presence of iron or aluminium in any case or at any concentration, by preventing the precipitation of these metals by citric acid may give rise to grave errors.

The existence of the phenomena studied by the authors does not compromise the present citrate method for estimating P_2O_5 in the superphosphates except in a few exceptional cases of superphosphates rich in aluminium. Nevertheless these phenomena should be borne in mind in doubtful cases. The facts studied show that the choice of the concentration and quantity of solutions to be used fixed by the Italian official method is very happy, as different amounts of ammonium citrate and magnesium mixture might give rise to great difficulties. The authors are, however, of opinion that, in view of the influence of its concentration on the formation of abnormal precipitates, the composition of the magnesium mixture should be more exactly fixed.

1217—Relation of the Density of Cell Sap to Winter Hardiness in Small Grains; Investigations in the U.S.A.—SALMON, S. C. and FLEMING, F. L., in the *Journal of Agricultural Research*, pp. 497-506, Washington, June 3, 1918.

The death of plant tissues from cold may be due to:—1) the formation of ice in the intracellular spaces; 2) physiological drought; 3) precipitation of the proteids; 4) desiccation of the protoplasm. In each case an increase in the electrolytic contents of the sap should increase the resistance of the plants to cold by lowering the freezing point and reducing transpiration. A close connection between the density of the sap and the resistance of the plant to low temperatures seems, therefore, probable. To study whether such a connection really exists in cereals the authors made a series of experiments with rye, wheat, emmer, barley and oats. The experiments were divided into three groups:—

Group I.—The sap was extracted by pressure after maceration or treatment with chloro-

form or toluene. A first determination, made with material collected on November 27, 1915, gave the following figures for the depression of the freezing point:—

	Freezing point
1) Rye	-1.044° C.
2) Durum wheat, Kharkof variety	-1.230° C.
3) Soft wheat, Fultz variety	-1.076° C.
4) Emmer (<i>Triticum dicoccum</i>), Black Winter variety	-1.012° C.
5) Barley, Tennessee Winter variety	-1.117° C.
6) Oats, Culberson Winter variety	-1.199° C.

No relation was observed between resistance to cold and sap density. It is true that the maximum depression of the freezing point is found in Kharkof wheat, which is very hardy, but Culberson oats, which are very sensitive to cold, also have a high coefficient, surpassing that of rye. These coefficients are, however, by no means constant, for in another determination made on December 17, 1915, Kharkof wheat had the lowest freezing point, -0.935°, whereas those for the other plants were, rye, -1.175°; Fultz wheat -1.442°; barley 1.320°; Winter Turf oats -1.260°; Culberson oats -1.445°.

Group II.—Results similar to the preceding ones were obtained without extracting the sap from the plants. The leaves were wrapped round the thermometer bulb, which was then placed in the freezing mixture. Three successive determinations were made:—1) January 16, 1917: rye, -3.560°, barley, -2.59°; 2) January 19. Kharkof wheat, -3.47°; rye, -3.58°; 3) January 27: Kharkof wheat, -2.17°; Fultz wheat, -2.06°; rye, -2.10°. The depression of the freezing point is, therefore, greater than for extracted sap. The differences between the kinds of grain do not, however, indicate any relation between the sap concentration and resistance to cold.

Group III.—A study was made of the effect on the depression of the freezing point of the turgidity of the tissues which, all else being equal, has a tendency to lower the resistance of plants to cold. Wheat and oat seedlings grown in greenhouses were carefully uprooted and divided into two groups:—1) before making the determination the seedlings were exposed to sunlight for two or three hours at room temperature, so that the leaves wilted partly; 2) the roots were immersed in water so that the leaves remained turgid. The values found for the depression of the freezing point were:—

	Lot 1 Wilted plants	Lot 2 Turgid plants
Turkey durum wheat	-1.945°	-1.405°
Fultz soft wheat	-1.930°	-1.308°
Winter oats	-2.160°	-1.236°

The difference between the freezing point of wilted and turgid plants of the same species is much greater than that between those of different species of equal turgidity. There is, therefore, an inverse correlation between the turgidity of the tissues and concentration of the sap.

1302—Disinfection of Seed Against *Pleospora graminea*, Injurious to Barley—LIND, J. and KOLPIN RAWN, F., in the *Tidskrift for Planteavl*, Vol. XXV, Pt. 1, pp. 56-116. Copenhagen, 1918.

From 1908 to 1916 numerous investigations have been made in Denmark to determine the best method of disinfecting seed barley against *Pleospora graminea* ("Stribesygge") which does serious damage to barley crops in the north of Europe.

If the necessary precautions are taken the best results are obtained by soaking the seeds in solutions of formaldehyde, copper sulphate and mercuric chloride. If the material is badly affected it is left in 0.2% of formalde-

hyde for 6 hours, or 0.5% of copper sulphate for 4 hours, or 0.1% of mercuric chloride for 2 hours. If the material is only slightly affected the time of soaking may be reduced by half.

Treatment with hot water may be carried out in three ways:—

a) soaking for five minutes in water heated to 133° or 135° F., the seeds being softened in cold water;

b) soaking in hot water followed by the drying of the material at high temperatures, 176° F. or more;

c) simple soaking in hot water followed by drying in the air at normal temperature.

The best results have been obtained with the last method although it is not so satisfactory as mercuric chloride, formaldehyde and copper sulphate. The appended table gives the efficiency of the different remedies by showing the decrease per cent of affected plants and the corresponding increase in the yield in grain and straw.

Treatment	Number of tests	Percentage of infected plants		Decrease in the percentage of plants infected as the result of the treatment	Percentage of increase in the yield of	
		Grains not disinfected	Grain disinfected		seed	culms
Hot water at 133-135°F, followed by drying of the seed at high temperature	4	15.3	5.3	10.0	8	4
Idem without drying	17	14.7	1.2	13.5	8	6
Hot water at 122-124°F, after softening of the seed	11	14.9	1.0	13.9	11	6
Soaking in copper sulphate	7	18.6	3.2	15.4	13	7
Soaking in formaldehyde.	8	20.9	3.4	17.5	12	9

If the treatment has no unfavourable influence on the germinating faculty or germinating energy there is for each percentage decrease in the number of plants infected an increase in yield equal to 0.6-0.8% for seeds and 0.4% to 0.5% for stems.

Early sowing in cold soil favours the development of *Pleospora*. If, in this case, later sowing is impossible, disinfection of the seeds becomes more important than ever.

1348—Measures taken in Hungary for the Production of Sugar Beet Seed.—*Wochen-schrift des Zentralvereines für die Rubenzucker-Industrie Oesterreichs und Ungarns*, pp. 122-123. Vienna, April 4, 1918.

By an order dated March 21, 1918, regarding the production of sugar beet seed, the Hungarian Government has made some regulations based on the emergency war laws. The chief articles are given below.

Article 1.—Every sugar-beet grower who, in 1918, had undertaken, by a regular contract with a sugar works, to grow 60 acres or more of sugar beets, is obliged to reserve $\frac{1}{4}$ of that area for the growth of seedbearing sugar beets.

The Sugar Beet Seed Commission (see Article 10) can allow fractions less than that fixed to be cultivated for seed and may in part or wholly exonerate growers from that obligation beyond a certain limit.

Article 2.—The beet grower must obtain his seed-bearing plants from seed with which he will be specially provided by the sugar works and according to rules laid down by the Ministry of Agriculture.

Article 3.—The beet grower must inform the sugar works as to the quantity of seed-bearers obtained during the first year, and if the works does not make other arrangements, he must keep the seed during the winter. The sugar works will then communicate the information received to the above-mentioned Commission.

Article 4.—On request being made by the growers, the sugar works are required to allow them advances at the time of declaring the seed-bearers up to the value of these and when the beets have been delivered for extracting the sugar.

Article 5.—In the case when the sugar works does not make different arrangements and even if the ordinary cultivation contract

has not been renewed, the grower is obliged to replant the seed-bearing sugar beet the following season and give them the usual attention.

Article 6.—If the grower does not replant the seed-bearing beets the sugar works is authorized, after duly informing the Commission, to confide the cultivation of the beets in question to other growers, paying the producer twice the maximum price fixed for ordinary beets if it is in autumn and 2½ times this price if it is in spring.

Article 7.—The sugar works is obliged to take away from the grower, up till December 1, 1919, the seed he has produced, free at the consigning station, at a price equal to 18 times the maximum price, for that year's beets, that is, at a minimum of 250 kroner per 100 kg (11.3d. per lb.) and according to the rules laid down by the Ministry of Agriculture.

Article 8.—The seed-bearing beets obtained in conformity with the present order are considered to be requisitioned, in the sense that they cannot be disposed of in other ways, save by authorization of the central Commission.

If the sugar works has been unable to obtain the seed it requires in this way, it can, through the Commission, obtain it from other works having too much seed.

The grower may not retain the seed he requires, but must obtain it from the sugar works.

Article 9.—Each sugar works must inform the central Commission as to the growers undertaking to grow sugar-beet seed, indicating the names, surnames, farms, districts, as well as the area cultivated for seed. This declaration must be made within the 15 days following the publication of the present order or within the 10 days after signing the contract.

Article 10.—To apply this order, a *Sugar Beet Seed Commission* is constituted, including a President, nominated by the Minister of Agriculture, 4 ordinary members and 2 deputies, of which 2 members and 1 deputy must be proposed by agricultural organizations and 2 members and 1 deputy by the sugar works. The Secretary of the Commission is the Director of the Plant Breeding Institute or his representative. The expenses of this Commission are paid by the Ministry of Agriculture.

Article 11.—The order does not guarantee the validity of contracts existing between growers and sugar works, contracts which must be in conformity with the dispositions of the said order.

Article 12.—Whosoever directly or indirectly in any way infringes the clauses of the order is liable to a minimum of 6 months in prison and 200 kroner fine. If it be shown that the defendant has even made a profit, he shall pay, over and above the fine, a sum equal to twice such profit. If the goods forming the subject of the infringement are found they will be confiscated; ½ will be

paid to the informer and the remainder, after costs are deducted, will be paid to the Disabled Soldiers Fund.

These measures are to be applied by those responsible for the public peace.

1349—Tests of Some Spring Wheats (Manitoba, Aurore and Marquis) in Vaucluse, France.—ZACHAREWICZ, in the *Comptes Rendus des Seances de l'Academie d'Agriculture de France*, pp. 825-828. Paris, October 2, 1918.

In 1917 and 1918 the author continued his tests at Avignon of Manitoba wheat for autumn and spring sowing, so as to find out whether its resistance to winter cold would be maintained and thus corroborate the results already presented to the Academy of Agriculture at its meeting on July 25, 1917 results that may be thus summed up: Manitoba wheat has shown its hardiness and its resistance to winter cold and may be therefore considered as much as an autumn as a spring wheat for the south of France.

As in the previous year, the trials were carried out in the experiment field of the "Ecole Normale d'Instituteurs d'Avignon," with the collaboration of M. Guerin, Professor of Physical and Natural Science at that school. The seed was drilled on land turned in autumn without any manuring. The previous crop was potatoes on broken-up grass-land with the addition of cake and calcium superphosphate. The author delayed the autumn sowing until December 15, 1917 so as to see how sensitive the germ was to cold. Just after sowing the thermometer fell so low that germination only took place between January 8-15 and very irregularly. In spite of this delay the wheat did not suffer at all. It was even so vigorous that in April it was topped to avoid lodging which partly occurred on June 17 during heavy rain accompanied by wind. The amount of straw produced per acre increased to 5,085 lb. per acre. The date of harvest compared with that of spring-sown Manitoba was only advanced 5 days.

The test of seed from two soils of different chemical composition only gave a slight difference in the yield.

Seed obtained from bearded ears gave yields distinctly higher than those from beardless ears (27.4 and 21.2 imp. bus. per acre respectively).

At the same time the author tested the varieties Kurrachee, of Indian origin, Aurore and Marquis.

The variety Kurrachee behaved very well. The stems were 31 in. high and gave square ears with black awns. The seed is red and elongated. This spring variety is hardy and seems worth propagating. The yield was 26.1 imp. bush. per acre.

The variety Aurore arrived too late and the yield was low on account of the drought (10.7 imp. bush. per acre). When sown in March it gave much more conclusive results in another experiment field. For the same

reasons the Marquis variety yielded still less (6.9 imp. bush. per acre).

36—First Generation Crosses in Cucumbers. HAYES, H. K., and JONES, D. F., in *Fortieth Report of the Connecticut Agricultural Experiment Station for the Year 1916*. New Haven, Conn.

It was the plan of this experiment to make a two year test of a few plants of various cucumber crosses as a preliminary survey of the value of the first generation crosses, and finally to test the better crosses on a commercial scale. The varieties used in the experiment were Early Russian, White Spine, London Long Green and Fordhook Famous. The two last named produce large sized fruit and vigorous vines, while White Spine produces fruit of medium size and medium sized vines, and Early Russian gives small vines with a large number of male and female blossoms with a tendency to set fruit in clusters.

The following crosses were obtained: Early Russian x White Spine, White Spine x London Long Green, London Long Green x Fordhook Famous, and Fordhook Famous x White Spine.

The cross Early Russian and White Spine gave about the same total average yield of fruit per plant as the higher yielding parent; the White Spine x Long Green cross exceeded the higher yielding parent by 24 per cent; the cross of Fordhook Famous x White Spine exceeded the better parent by 29 per cent, while the London Long Green x Fordhook Famous cross gave about the same yield as the parents.

The character in which the increased vigour of the crosses is chiefly manifested is the number of fruits per plant. All of the crosses exceeded the more prolific parent by an average of 1 6 to 8 fruits per plant, which is from 6 to 27 per cent.

LIVE STOCK AND BREEDING

1371—The First Tests of Vaccination against Epizootic Lymphangitis.—BOQUET, A., NEGRE, L., and ROIG, G., in the *Bulletin de la Société de Pathologie Exotique*, Vol. XI, No. 7, pp. 551-553. Paris, 1918.

By means of cultures of RIVOLTA's parasite, obtained recently, the authors have been able to carry out tests of preventive vaccination against epizootic lymphangitis which previously was impossible as the cryptococcus had not been cultivated in series. The method is based on the fact, discovered by the authors, that the serum of animals affected for more than 15 days, or cured, is rich in antibodies and that the natural or experimental disease confers immunity. The colonies of cryptococci, two months old, are ground in a dry state, emulsified in physiological salt solution, then placed in capsules which are heated at 62-64° C. for one hour. Four hypodermic injections of 5 cc. are given in the neck at intervals of 8 days.

The authors describe, as an example, an experiment made on 4 healthy horses treated by this method. The injections caused a slight oedema at the point of injection followed, after its disappearance, by a slight hardening, but causing no open abscess. Eight days after the last injection, 2 horses were given, as a test, a hypodermic injection of 4 cc. of living cultures of cryptococci emulsified in physiological salt solution. The results were as follows:—the two vaccinated horses not inoculated with living cultures showed no symptom whatever of lymphangitis after 3 months; nor did the other 2 horses. The authors conclude that the vaccinated horses seem to have been immunised by the injection of heated cultures against the inoculation of living cultures of RIVOLTA's cryptococcus. They further add that the 4 horses vaccinated lived in the closest contact with gravely infected animals, and that these results show the possibility of vaccinating horses against epizootic lymphangitis by inoculation of sterilized cultures.

1374—The Control of the Blow-Fly and the Sheep Maggot Fly in Queensland.—*Queensland Agricultural Journal*. pp. 136-137. Brisbane, April, 1918.

I.—BLOW-FLY-TRAP.—Mr. H. A. Adams, of Yalleroi, Queensland, has made a cheap trap for blow flies (*Calliphora* sp.) with a petrol tin. The tin is cut near the square upper end, on three of the vertical sides, then the upper part thus cut is bent over on the vertical side left intact; in this way an upper and a lower compartment are formed. In the lower half decomposed sheeps' entrails are put as a bait and in the upper half a sweetened arsenical solution. Two strips of flannel, about 2 in wide are arranged so that they reach the bottom of the liquid and rest on the bait which is thus kept well poisoned. The bait must be well decomposed before using or the arsenic will prevent it from decomposing.

II.—CONTROL OF THE SHEEP MAGGOT FLY (*Lucilia sericata*).—The author (L. G. Jones) thinks that the dags where the fly usually lays her eggs, should be left on the sheep, instead of cutting them as is often done; the dags should be poisoned by submerging them in a very strong arsenical solution. The solution is prepared by heating $\frac{1}{2}$ lb. of washing soda in 4 gallons of rain water nearly to boiling point and then adding 1 lb. of commercial arsenic; it is then brought quickly to the boil, continuing for 15 minutes. As soon as the mixture is lifted off the fire, 4 pints of cold water are added and stirred well in, as after arsenic has been boiled in water it goes more completely into solution when suddenly put off the boil. The author is of the opinion that there is no advantage in using poisoned ofal baits. It has even a contrary effect for, after a short time the fly leaves its natural medium—carcasses—and attacks the sheep. On the other hand

the poisoned dags repel the flies to the advantage of the sheep. In addition the sheep should have an arsenical sheep lick (4 parts of salt + 1 part of a mixture of $\frac{1}{4}$ of iron ore and $\frac{1}{4}$ of mispickel). All the arsenic would not be absorbed by the organism, and a part would pass out with the droppings, which would then be in such a condition as to retard greatly the development of the maggots. If the fly lays eggs on any part of the sheep's body other than the tail, it is because the yolk is diseased (damp, sticky and often badly smelling), the sheep being in bad health. In this case iron is a very appropriate medicine for sheep¹.

1382—Crosses Between the American Bison, the European Bison and Domestic Cow Made in the Zoological Garden of Askania-Nova (Government of Tauride, South Russia).—IVANOV, E., and PHILIPTSCHENKO Jur., in the *Zeitschrift für induktive Abstammungs- und Vererbungslehre*, Vol. 16, Pt. 1-2, pp. 1-48. Leipzig, 1916.

During the summer of 1913, the authors studied the crosses made by M. F. E. Falz-Fein between the American bison (*Bison americanus*), European bison (*Bison bonasus*) and the domestic cow in his zoological garden at Askania-Nova; there were then 25, the most typical of which were described, with figures and measurements.

CROSSES BETWEEN AMERICAN BISON AND EUROPEAN BISON.—According to the authors, such crosses have not been previously made save at Askania-Nova. There were adult hybrids (two 5-year old males and one 4-year old female, "Sanka") produced from a male European bison and a female American bison. In 1911 the female "Sanka" was mounted by a European bison, and produced a heifer calf in 1912. Next crossed with an American bison \times European bison hybrid, she gave, in 1913, a bull calf; this represents the F_2 generation of the cross between American and European bison. The progeny of the female "Sanka" are still too young to be used in the research.

The American \times European bison hybrids have, as regards their exterior, a form intermediate between that of their parents. The head, as regards the hair and fringe on the throat, resembles that of the American bison rather than that of the European one. The hump is smaller than in the American bison and its sweep to the head is less stiff and is more similar to the European bison. The resemblance of the animals to the European bison holds good also for the hindquarters. The tail is of intermediate development. On the contrary, the colour is like that of the European bison. As re-

gards size and development, the hybrids equal or surpass their parents. If their characters remain constant in future generations (which is not yet certain), the authors think these forms would have to be considered as a new species, which they propose to call *Bison falzfeini*, in honour of the breeder.

CROSSES BETWEEN AMERICAN BISON AND DOMESTIC COW.—On crossing a male American bison with a domestic cow, 2 males (now aged 14 and 13 years) were produced in the first generation, as well as 2 females (13 and 11 years). As the 2 males ("Mischka" and "Selifon") were sterile, they were castrated. The females ("Staraja" and "Podpalaja"), however, were fertile, and on crossing either with American bison or domestic bulls, calved each time.

Of the two half-blood males, the authors only studied "Mischka," a typical intermediate form between American bison and domestic cow. The head, with a beard, strongly resembles that of the American bison. The tuft of hair at the lower part of the chest is also characteristic. The front legs have long hairs falling down to the knees. The horns, are however, like those of the mother (grey breed from the Ukraine steppes). The hump is less pronounced than in the American bison, but is of the same type. The back and hindquarters are very like those of the American bison; the tail, intermediate between that of the American bison and that of the domestic cow, is shorter than in the European bison. The skin is of a dark colour.

Amongst the half-blood females, one ("Staraja," obtained by the cross American bison \times grey cow of Ukraine steppes) well shows the type intermediate between the parents, although its characters are less marked than in the male progeny. This animal resembles an ordinary cow much more than its brother does an ordinary bull. The head, which is bearded, resembles that of the American bison; the chest has a tuft of hair. The horns are those of the domestic cow. The thorax is shaped generally like that of the cow, and the hump is not pronounced. The hindquarters recall those of the American bison; on the contrary the tail is more like that of the cow. The colour is dark.

Another half-blood female, "Podpalaja," is clearly different from the preceding one, for it is the daughter of another American bison and a shorthorn cow. It resembles the cow much more than the first, especially in the head. The beard and the tuft of hair on the chest are not much developed; the animal has a hump. The general colour is black, with white splashes on the belly and lower chest. Henseler's observation that, in crossing Shorthorns with various wild forms (gayal, yack, etc.) the stripes sometimes seen in Shorthorns appear, has not been confirmed in this case.

¹Reduce to a fine powder and mix 1 part of iron-stone (containing chiefly a mixture of ferrous and ferric oxides) with 4 parts of mispickel; mix the whole with salt at the rate of 1 to 4 and give the stock free access to it in their troughs. This provides a good remedy against intestinal and blood parasites as well as an excellent tonic.

The half-blood female, "Staraja" crossed with an American bison gave a heifer calf, "Slepaja," which is a $\frac{1}{2}$ blood female bison. This animal is more like a female American bison than a cow. The head is that of the American bison, the neck and beard are strongly-developed; the lower part of the chest has a heavy tuft of hair. The horns have, like those of the $\frac{1}{2}$ -blood forms, the characters of the horns of the domestic cow. The hump is small and the hindquarters resemble those of the bison. The colour is like that of the American bison, but is lighter on the hindquarters.

On crossing the half-blood female "Podpalaja" with a Shorthorn bull a female ("Belaja") was obtained with $\frac{1}{2}$ Shorthorn and $\frac{1}{2}$ American bison blood. This animal so closely resembles the ordinary cow that its hybrid character cannot be determined at first sight. White colour. The only characters recalling the grandfather (American bison) are the hump and the tuft of hair on the lower part of the chest.

As regards temperament, all the hybrids (including the $\frac{1}{2}$ Shorthorn cow) resemble the American bison most.

CROSSES BETWEEN EUROPEAN BISON AND DOMESTIC COW.—A half-blood male ("Herkules"), son of a European bison and a grey Ukraine cow, was sterile, and so was castrated like the half-blood American bison. It resembled the European bison much less than the half-blood American bison do the American bison. The head is that of the cow, but it has a beard and there is a tuft of hair on the chest. From the length and shape, the horns are of the bovine type. There is a hump, but it is smaller than in the European bison. The general constitution and colour make it an intermediate form between European bison and Ukraine cow.

A half-blood female ("Galka"), out of another European bison and another grey Ukraine cow, shows similar characters, and resembles rather the domestic cow. The head is that of the cow and the horns are those of the Ukraine cow. From the father are derived the beard and tuft of hair on the chest. The body is similar to that of the cow, but there is a well-developed hump. The animal is coloured like the mother.

Another half-blood female ("Dunja"), out of a European bison and a grey Ukraine cow, has similar characters, but, on account of the animal's youth, they are less pronounced. The colour is not grey, but black.

The half-blood female "Galka" crossed with a European bison gave a bull calf ("Otboj") with $\frac{1}{2}$ European bison blood. Allowing for its small size and other characters showing mediocre development, it is fairly distinct from the half-blood forms; it is most like the European bison. Both head and chest are very hairy, and the horns are of the cow type. The hump and hindquarters completely recall the European bison, while the colour is more like that of

the cow. On the whole, this male resembles a European bison most.

A $\frac{1}{2}$ blood female ("Golubka"), out of the $\frac{1}{2}$ -blood female "Galka" and another European bison, has the same characters as the male "Otboj", but temperament, horns and colour are most like those of the European bison.

"TRIGENOUS" HYBRIDS BETWEEN EUROPEAN BISON, AMERICAN BISON AND DOMESTIC COW.—These are the progeny of the half-blood females (whose father was an American bison and mother a cow) crossed with a European bison. The males have not yet been used for reproduction, but they should be fertile as the sperm of one male contained normal spermatozoa. The females are certainly fertile. The authors describe some of the hybrids.

The male "Bjelmordij" differs from the half-blood American bison and the half-blood European bison by many characters. The head and strongly hairy coat recall the wild American bison, but in most of the characters it resembles the European bison. The beard and tuft of hair are as well developed as in the European bison, but the front quarters are less hairy than in the two species of bison. The horns are like those of the cow; the colour is dark, as with the European bison. This is a most original form, which most resembles the European bison (not as much, however, as the $\frac{1}{2}$ -blood male "Otboj"), but showing a notable maternal influence.

Another male, "Petjka", is very similar to the previous one, but is smaller. The difference is seen in the fore-quarters (nape, neck, chest) which are more like those of the cow.

In a third male, "Dubass", the characters are the same as in the previous one; the hair of the head and fore-quarters most resemble those of the male "Bjelmordij".

Another male, "Martin", has characters very different from the 3 previous ones. The hair on the body and fore-quarter is less developed, the horns smaller, but the hump is bigger and the tuft of hair is longer. As this animal is still young, some of its characters may change in time.

A female, "Lyssa", has, like all the females, less hair on the head, so that it is more like an ordinary cow. The beard and tuft of hairs on the chest are well developed, however, and the horns resemble those of the European bison. On the whole, the characters incline more towards those of the European bison.

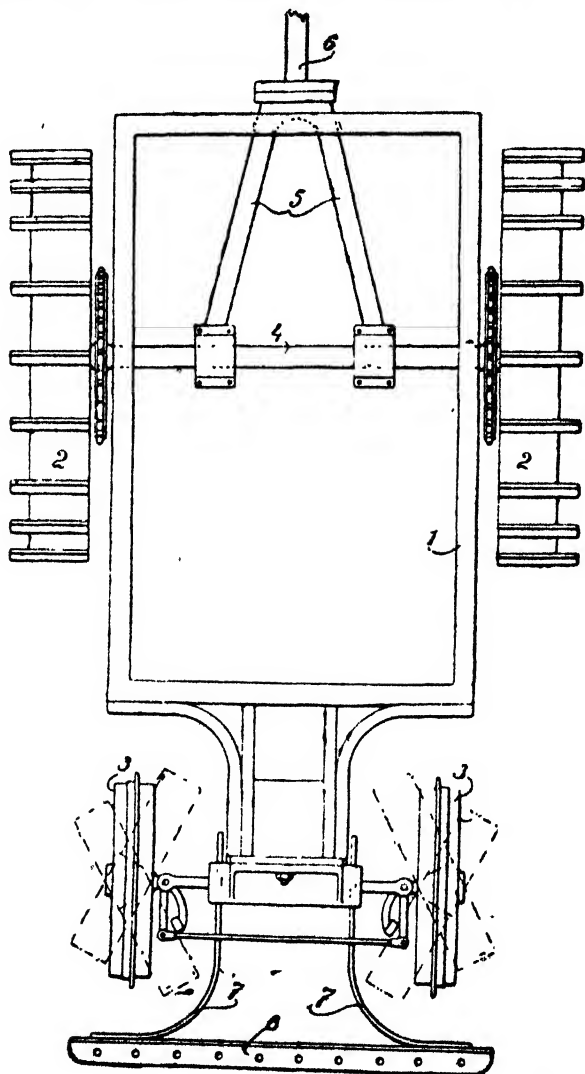
The author describes a "trigenous" female ("Tschubataja") which does not contain $\frac{1}{2}$ cow's blood like the previous ones but $\frac{1}{4}$. The head is, broadly speaking, like that of a female produced by the cross American bison \times European bison. The horns are just like those of the American bison. The lower part of the chest and the upper parts of the fore-quarters are very hairy. The tail is like that of the European bison but is shorter; the part between the root and the tuft has

the character peculiar to crosses between American bison \times domestic cow. On the whole, the female "Tschubataja" mostly resembles, not the pure blooded European or American female bison, but the female "Sanka" given by the cross American bison \times European bison. As "Sanka" has $\frac{1}{2}$ American bison blood and $\frac{1}{2}$ European bison blood and "Tschubataja" has $\frac{1}{2}$ American

FARM ENGINEERING.

94—Ohio's First Tractor School.—*The Department of Agriculture of Ohio, Official Bulletin*, Vol. IX, No. 1, pp. 4-10, Columbus, Ohio, 1918.

From Feb. 11 to 16, 1918 more than 1,500 farmers took advantage of Ohio's first tractor school. Eighteen different makes of



PLAN OF DANCHAUD TRACTOR

bison, $\frac{1}{2}$ European bison and $\frac{1}{2}$ domestic cow, the resemblance of the two hybrids is easily explained.

In conclusion, the authors give measurements of 12 crosses (American bison \times cow, European bison \times cow, "trigenous" hybrids), but give the warning that they are not all reliable.

tractors were exhibited, tested and minutely explained by factory experts. On that date there were nearly 3,000 tractors in operation in Ohio with a prospect of a 100 per cent increase in 1918. The most satisfactory phase of the entire undertaking was not the large number present but was the sincere and active interest taken in the work. The care

of the tractor, troubles occurring during work and means of preventing them, the mechanical parts of the tractor, were subjects treated in a practical way by the lecturers.

A table is given containing information furnished by owners of farm tractors. Among other things the table shows that 803 farmers were reported satisfied with the tractors, 89 did not find them satisfactory; 825 declared that they had experienced no difficulty in securing new parts, 63 had encountered such a difficulty, 684 farmers were willing to loan their tractors, while 168 were not. The average cost of ploughing an acre was \$2.83 ranging from \$2 to \$5.

1401—Simultaneous Harvesting and Breaking-up of the Stubble with a Tractor.—*Le Genie Rural*, Year X (New Series, No. 24), No. 84, pp. 7-8 + 2 Figs. Paris, 1918.

To hitch a 13-time MASSEY-HARRIS cultivator to a binder towed by an AVERY tractor, M. GRATEAUT, of Epernon (Eure-et-Loire), France, uses an iron bar 6 feet 6 inches long bolted on to the shaft of the binder and clamped behind on the binder frame. On the steering device of the cultivator are bolted 2 flat irons joined by a bolt to the end of the bar projecting from behind the binder. This device is to leave steering free in a vertical direction but to render it rigid horizontally, so as to allow the binder and cultivator to back if required.

M. L. DANCHAUD, of Levet (Cher), has designed a device similar to that just described and which is also intended to carry out 2 operations at once. Although less simple than the former, as it requires a special tractor, M. DANCHAUD's device is said to constitute a great progress in mechanical traction. Instead of towing the binder by a tractor and hitching a stubble breaker behind the binder the new arrangement makes it possible to attach the binder in front of the tractor and the stubble breaker behind. Thus the tractor pushes one machine and pulls the other. One man can drive the tractor and supervise the working of the 2 machines. Moreover, as the binder is in front of the tractor, it can cut a greater width as there is no risk that the tractor will pass over the uncut crop. Other machines that work suitably together can be used to replace the binder and stubble breaker (hay mower and hay maker, or one binder in front and another behind the tractor).

In addition the device is well suited to the direct driving of the working parts of agricultural machines in general and specially of binders and reapers by the tractor engine. The appended design gives a plan of the invention. The apparatus includes a frame on which is mounted the engine with the gear, drive and controls. The frame is mounted on two driving wheels 2 in front and 2 steering wheels 3 in the rear. In front of the frame two arms 5 are mounted on the axle 4 and carry a shaft 6 for connecting with

the machine to be driven or partially or totally supported.

In the rear of the frame, the arched pieces 7 of the steering gear are mounted. These pieces have their end joined to a draw bar 8 for such agricultural machines as have to be drawn by the tractor.

AGRICULTURAL INDUSTRIES.

111—Grain Dust Explosions in Mills and Elevators in the United States.—DEDRICK, B. W. and PRICE D. J. in *United States Department of Agriculture Bulletin*, No. 681, 54 pages, Washington, May, 1918.

Besides investigations into explosions in threshing machines (1) the Bureau of Chemistry of the United States Department of Agriculture undertook, in collaboration with the Pennsylvania State College, studies of the causes of grain dust explosions in mills and elevators in order to find means of preventing the large number of fires occurring in such installations.

For the purpose of conducting the experiments a small light-frame building (15 x 15 x 24 feet), covered with galvanized iron, was erected by the Department of Mechanical Engineering, Pennsylvania State College. A 16 inch attrition mill was installed on a platform 14 inches high, with a removable hopper underneath. Two elevators, one dump bin, a stock hopper over the mill, and a small bin for receiving ground materials were also provided. A screw conveyor 10 feet long was placed 2 feet below the floor to receive the material from the mill, and to carry it to the chop elevator or out into the dust room. The attrition mill, screw conveyor, and elevator were driven by a 15 horsepower direct current motor, located in the basement.

The final conclusions may be summarized as follows:—

1. Every effort should be made to collect and move the dust from the grinding mill and surrounding atmosphere.

2. In some cases it may be advantageous to use inert gasses to decrease the oxygen content and thus prevent the formation of an explosive mixture of air and dust.

3. Every possible source of heat should be eliminated where there is any danger of having a dust-laden atmosphere.

4. Every precaution should be taken to eliminate sparks due to static electricity.

5. Greater use should be made of sheet iron on account of the very great danger from smouldering lumps of grain.

6. Revolving dampers, as installed here and elsewhere, appear to be of some value as preventive measures for the propagation of explosives.

7. The principle of the automatic relief valve should receive more attention as a possible remedy to apply for the partial prevention of the propagation of the flame.

(1) See *Agricultural Gazette*, July, 1917, p. 628, No. 1208.

1420—The Manufacture of Casein from Buttermilk or Skim Milk.—DAHLBERG, A. O., in the *United States Department of Agriculture Bulletin* No. 661, pp. 32. Washington, April 9, 1918.

The utilization of by-products by a large number of creameries is daily becoming of more economic importance. Because of the ever-increasing competition, the future success of many creameries depends in no small degree upon both the quality of their products and the extent to which by-products may be profitably utilized.

In the past skim-milk casein is the only kind that has been made in large quantities; a good grade of casein can also be profitably made from buttermilk, when it does not bring exceptional prices for food. It is advisable to convert the buttermilk into food products when proper markets can be obtained, as greater profits can then be obtained. But as it is not always possible to utilize all the buttermilk in this way, it is important to be able to turn the surplus into casein, which keeps perfectly and finds a ready market.

BUTTERMILK CASEIN.—The recovery of casein from buttermilk by the method to be outlined depends on the normal acidity of the buttermilk. The sour buttermilk from the churn, or that which has ripened to the required acidity, is heated sufficiently to cause a rapid separation of the curd and whey. Owing to the fineness of buttermilk curd every precaution must be taken to prevent it from being broken up any finer, which makes handling more difficult. Turning steam directly into the butter tends to break the curd up. The method devised for suitably heating the buttermilk is to run it through a steam jet or ejector, which gives the desired temperature in a rapid and efficient manner and with very little agitation of the curd. With buttermilk of sufficient acidity a good separation should be obtained at a temperature varying between 115° and 130° F. (46.11° and 54.44° C). This method is based on results obtained in devising a method for handling surplus buttermilk at the Grove City Creamery, Pa., operated under the supervision of the Dairy Division, U.S. Dept. of Agriculture. The method has been thoroughly tried in a commercial creamery, where it is giving most satisfactory results.

Precipitating the curd.—The buttermilk from the churn is pumped into a tank elevated sufficiently to allow it to run by gravity through an ejector and from there into another tank below, whose gate valve is high enough to let the drain rack run under it. To save time, the heating should be done quickly. A valve placed in the buttermilk pipe leading from the tank to the ejector, and one in the steam pipe next to the ejector, permit easy control of the temperature to which the buttermilk must be heated to obtain proper separation. While conclusive data bearing on the acidity required for the

most favourable results have not been obtained, an acidity of from 0.65 to 0.80% at the time of precipitation apparently gives the best working conditions. Buttermilk kept too long and highly acid tends to give a soft, sticky curd difficult to handle, especially when a high precipitating temperature is used. By varying the temperature used the proper degree of heat necessary to get good results may be obtained. At that temperature the buttermilk coming from the ejector is in such a condition that the curd rises quickly to the top, leaving the clear whey below. As soon as the curd has massed at the surface, which requires only a few minutes, the greater portion of the whey can be drawn from the bottom of the vat into the cloth-lined drain rack. The clear whey passes through the drain cloth quickly and by gradually closing the gate valve as the curd lowers in the vat, nearly all of it can be drained away. When the whey has drained away, the hot curd is placed on the drain racks ready for washing. The curd is washed at least twice with cold water, using a shower-bath spray nozzle. The drainage water should test less than 0.20% acidity, which is possible with two washings. The curd is placed in a form made of 1 inch surfaced material 20 inches square and 8 inches deep which is lined with 2 press cloths; the cloths are turned over from both sides so as to hold the curd securely when pressure is applied. The curd is pressed heavily until the curd is sufficiently dry for satisfactory grinding. The dry curd is ground finely, then dried. Fine-mesh screening must be used for the drying trays, as the buttermilk casein is very fine, not flaky like that made from skim milk by the addition of commercial acid. The curd is then spread uniformly over the drying trays by means of a simple shaker screen, like those used for screening sand.

The time required for proper drying depends on the condition of the curd, the uniformity of the spreading on the trays, and the volume and temperature of the air passing over the curd. The volume and speed of the air blowing over the curd should not be excessive, but sufficient to carry off the moisture readily. If the air current is too swift the dried casein is blown off the trays. A temperature of 130° F. (54.44° C.) is sufficiently high for all purposes. Casein dried at that temperature comes from the drier in a fine-grained condition and breaks up easily, while that dried at a higher temperature tends more to cake in one mass and is harder to grind to the same degree of fineness. High temperatures may give casein that is more difficult to dissolve or discolour. The casein can be dried completely in seven hours at 130° F., provided that the curd has been properly ground and spread upon the trays in the proper manner.

The best type of drier is made of tongue-and-groove boards nailed both sides of the studding, the space between being filled with insulating material. The tunnels should be

lined with galvanized iron if they are to be used continuously as the hot air dries the boards out. The double tunnel drier is the most economical. The tunnel should be 1 inch wider than the trucks and drying trays. Many tunnels are made 31 or 32 inches wide, to take the 30 in. square drying trays that can be bought ready made. The tunnels used in these experiments were 24 in. wide. A double-tunnel drier, 22 ft. long, 5 ft. high, and each tunnel 24 in. wide will hold trays filled with the casein from 20,000 lb. of buttermilk. The driers can be made of any length and height but should be high enough to allow a man to walk in and out easily when pushing the trays.

A blower of sufficient capacity to send a large volume of heated air over the ground curd is required. Details are given for the construction of the drying trays and trucks, the curd mill, the curd press, the drain rack (like those used in the manufacture of cottage cheese) and other accessories.

It is advisable to grind and screen the casein after it comes from the drying tunnel in order that it may be of uniform grain and appearance; after it is shipped in strong sacks.

On the average 100 lb. of undiluted buttermilk yield on the average from 2.8 to 3.1 lb. of dried casein. In many creameries the cream is diluted with too large a quantity of water before churning, thus giving lower yield of casein.

No definite figures can be given on the cost of manufacturing, as cost-accounting data were not kept that could give results applicable to ordinary creamery conditions. If 10,000 lb. or more of buttermilk are handled daily the cost of making dried casein should not exceed 3 cents per lb. in the U. S.

The factors that have an important influence upon the quality of the buttermilk casein are:—the fat content of buttermilk; washing the precipitated curd; temperature of drying the ground curd; temperature of precipitating the curd; acidity of buttermilk at the time of precipitation. These factors are considered separately. Since the fat originally in the buttermilk is concentrated in the dried casein, it probably has a deleterious effect upon the strength and general working properties of the casein. An increased quantity of fat yields a casein of poorer solubility and strength. The effects of these various factors are shown in a number of tables.

SKIM-MILK CASEIN.—This is usually made by adding crude commercial sulphuric acid to the fresh skim milk after heating the latter to a temperature of 120° F. (48.89° C.). The advantage of this method is that the skim milk can be disposed of quickly and at a time when the quality of the curd is in the best condition.

The skim-milk is heated directly by steam in a wooden vat to 120° F., never above 125° F. Commercial sulphuric acid (1.83 specific gravity) is then added at the rate of one pint to every 1,000 lb. of milk, at the same time

stirring the mixture continuously. Before using, each pint of acid, should be diluted with about a gallon of water. After adding the acid the skim-milk is stirred gently until the curd is well separated, which takes only a few minutes. If the curd does not separate well more acid may be added. The clear whey is run off and the curd remaining in the vat is rinsed with cold water to remove the excess of whey and acid remaining. The curd is then placed in the burlap or duck press cloths and put to press till sufficiently dry. The curd is then ground, placed on the trays and dried in the tunnel drier.

The cooked-curd method of making skim-milk casein, requiring practically no equipment save the precipitating vat, is coming into general use among creameries near to a central drying plant. The skim-milk is heated to 120° F. and sulphuric acid added to coagulate the casein, as described above. After draining off the whey the curd is broken up in the vat, covered with water, and the mixture heated to 170°-175° F. (76.67° to 79.44° C.) by means of direct steam. At that temperature all the curd should collect in a semifluid, plastic, tough mass. The water is drained off and the soft curd placed in a barrel, where it settles into an almost airtight mass which on cooling changes to a very tough impervious mass that will keep for several days, even in hot weather. The barrels filled with cooked curd and covered with burlap can be shipped to the central drying plant. Cooked curd is hard to grind and requires an especially strong mill.

Casein can be made successfully from skim milk with the ejector method of precipitating the curd, but care must be taken in allowing the skim milk to curdle before heating, or a tough, rubbery curd, impossible to handle, will result. The curd from naturally soured skim milk, separated by the ejector method of heating, is not only handled as easily as that precipitated with sulphuric acid but is not nearly so tough nor so hard to grind.

From 100 pounds of average skim milk between 3 to 3.25 lb. of casein can be obtained.

After describing the requirements for good casein (especially its solubility, adhesiveness, and general working qualities), the author considers the casein markets and prices.

A few years ago casein cost from 5 to 7 cents a pound, but during the last 2 years the price has doubled or more; at one time even 22 cents a pound was offered in the United States.

128.—Marketing Butter and Cheese by Parcel Post in the United States.—FLOHR, L.B., and PORTS, R.C., in *United States, Department of Agriculture, Farmers' Bulletin* 930, 12 pp. Washington, 1918.

Experimental shipments of fresh butter aggregating more than 2,000 pounds, in 2, 3, 5, and 10 pound parcels, were made from four creameries to the United States Bureau of Markets in order to test the feasibility of transporting butter by parcel post.

Of 222 shipments of butter made from April to October from a creamery 375 miles from Washington, 218 were received in a satisfactory condition. During August and September only 1 out of 61 shipments from a creamery 536 miles from Washington was received in an unsatisfactory condition. In June and July 73 parcels out of 82 were received in good condition from a creamery 187 miles away. The fourth creamery, 206 miles distant, shipped 89 parcels from April to January, all of which arrived in good condition.

The parcels of butter received by the Bureau of Markets were shipped to experiment stations and by them shipped back to the Bureau and were received in a satisfactory condition when the heat and distance were not great. The results of these experimental shipments indicate that well-made butter, thoroughly chilled before shipping, when packed in a suitable container, may be marketed satisfactorily by parcel post when extreme high temperatures are not encountered. Even though proper safeguards were taken, the shipments made during extremely hot weather frequently arrived in an oily and unsatisfactory condition.

129--Trade in Frozen and Refrigerated Meats in Venezuela.—*Le Froid*, Vol. VI. No. 7, p. 125, Paris, July, 1918.

"The Venezuelan Meat and Products Syndicate Limited" is the only enterprise in Venezuela exporting frozen and refrigerated meats. It is of English origin, and was founded nine years ago, with a capital of \$800,000.

It is situated at Puerto-Cabello, more than half a mile from the wharf to which the products are carried on the railway in cars owned by the company. The installation can slaughter as many as 300 cattle per day, and the cold storage compartments have a capacity of 3,000 tons of refrigerated meats. The company sells its products directly to the British and French Governments. Lately the company purchased over 7,000 square miles of grazing land in Venezuela. The exports of salt and refrigerated meats amounted in 1916 to 7,294,000 pounds valued at \$370,000.

PLANT DISEASES

1305—*Colletotrichum linicolum* n. sp., Injurious to Flax Seedlings, in Ireland.—PETHYBRIDGE, C. H., and LAFFERTY, H. A., in *The Scientific Proceedings of the Royal Dublin Society*, pp. 359-384 + 2 Plates. Dublin, August, 1918.

Flax growers in the north of Ireland frequently complain of a disease of the seedlings which they call "yellowing." The attention of the authors was first drawn to this trouble in the early part of the summer of 1916, when diseased plants from farms in Antrim were sent to them for examina-

tion. Observations made by one of the authors during the following spring in Antrim and neighbouring counties showed the disease to be common and the cause of considerable damage to the young crop in some cases.

The principle symptoms of the disease are the development of spots on the cotyledonary leaves and lesions on the young stems which, in many cases, cause the death of the seedling by a process resembling "damping off" (*Pythium de Baryanum*).

A species of *Colletotrichum* was found associated with the disease. This fungus was isolated and grown in pure culture. Infection experiments made with it showed it to be the cause of the disease. To some extent the disease resembles "flax canker," attributed in the United States to *Coll. Lini* Bolley (1910). It resembles more closely a disease of flax in Holland, ascribed by Schoevers (1915) to a species of *Colletotrichum* which, according to information supplied to the authors by Bolley, is the same as the fungus observed by him in America.

Under the name of *Coll. linicolum*, the authors describe the fungus, proved by them to be the specific agent of the disease, as a species new to science. It was found that the mycelium of the fungus hibernates within the cells of the epidermis of the seed-coat and that the disease is transmitted by the seeds. Transmission of the disease may be largely prevented by deep sowing, so that, on germination, the seed-coats remain underground. This, however, is not a practicable method of control. The disinfection of infected seed with formalin and hydrogen peroxide greatly reduced the number of diseased plants but did not completely eliminate the disease. Treating slightly moistened infected seed with a mixture of finely powdered copper sulphate crystals and dry sodium carbonate suppressed the disease entirely.

Flax-seed from Russia, Holland, Canada, and the United States has been found to produce diseased seedlings, and the disease is believed to be widespread all over the world.

INJURIOUS INSECTS

1431—Enemies of the Chinch-bug (*Blissus leucopterus*), Observed in Illinois, U.S.A.—FLINT, W. P., in the *Journal of Economic Entomology*, Vol. XI, No. 5, pp. 415-419. Concord, N.H., 1918.

Up to now it has usually been supposed that the enemies preying on the chinch-bug were only of very limited efficacy in limiting the ravages of that insect. Observations made in Illinois during the recent plague there of this hemipteron (1909-1915) show the contrary however.

The enemies most commonly found feeding on *Blissus leucopterus* in the infected zone were adults and nymphs of the damsel bug (*Reduviolus fers*), larvae of *Chrysopa* and *Hemerobius*, adult *Blechnus glabratus* and

Bl. pusio, nymphs and adults of *Pagasa fusca*, larvae of various species of Coccinellidae, nymphs and adults of the flower bug (*Triphleps insidiosus*).

Casnomia pennsylvanica feeds on small numbers of the bug, while *Agonoderus pallipes* eats the dead bugs and their moulted skin.

Ants were never seen to attack the living insect.

Judging from the abundance of enemies in the fields infested by *Blissus leucopterus*, and the numbers of the latter eaten by them it is probable that when, after a period of abundance, the development and spread of the hemipteron are stopped by weather conditions, their enemies, with *Eumicrosoma benefica* (parasite of the eggs of *Blissus*), might even prevent the pest from becoming harmful for some years. Thus, over a large area of Illinois, infested by chinch-bugs, no damage was noted in 1917, which is partly due to the abundance of predatory species in the fields. *Red. ferus* and *Pag. fusca* were extraordinarily abundant in fields infested by *Bl. leucopterus* during the summer of 1918.

1433—*Apanteles lacteicolor* and *Meteorus versicolor*, Hymenoptera Parasitic on the Brown-Tail Moth (*Euproctis chrysorrhæa*), Imported into the United States from Europe. MUESEBECK, C. F. W., in the *Journal of Agricultural Research*, pp. 191-206. Washington, July 29, 1918.

In the winter of 1905-1906, as the result of arrangements made by the Washington Bureau of Entomology for the importation from Europe into New England of parasites of *Porthetria dispar* (gipsy moth or bombyx disparate, spongy, zigzag) and *Euproctis chrysorrhæa* (brown-tail moth), a large number of winter webs of the second species were sent from Massachusetts to the special laboratory, then at North Saugus, but moved later to Melrose Highlands. This material was placed in special tubes, and, at the beginning of the following spring, were observed in the tubes numerous specimens of *Pteromalus egregius*, a chalcidoid ectoparasite of the wintering brown-tail moth larvæ, as well as many specimens of *Monodontomerus aereus* Walker, another chalcidoid which often hibernates in the adult stage in the web of the moth. The moth larvæ soon became active. As it seemed unlikely that these larvæ should be the hosts of endoparasites they were removed from the tubes and destroyed with the exception of a few which Mr. E. S. H. TITUS, who was then directing the investigations, continued to feed for a certain time. From these larvæ were obtained two braconid parasites, one belonging to the genus *Apanteles*, the other to the genus *Meteorus*.

As the result of the discovery made by Mr. TITUS, the moth larvæ in webs received in America during succeeding winters were not destroyed when they emerged in spring, but were fed for several weeks in order to

rear out any endoparasites they might contain. This method was followed till 1911, when importation was stopped. There were then available for distribution in localities infested by the brown-tail moth about 40,000 cocoons of *Apanteles lacteicolor* and 1,600 of *Meteorus versicolor*. These species are widely distributed in Europe, both having been obtained from moth webs sent from France, Holland, Germany, Russia (especially South Russia), Austria, Switzerland, and Italy. The spread of the parasites has been so rapid that, although only 150 colonies of *Apanteles* and 20 of *Meteorus* have so far been distributed in 135 and 18 localities respectively, no further colonies are required. Both parasites have been recovered from the whole brown-tail moth area either by rearing the moth larvæ in spring or by dissecting the hibernating larvæ.

The two braconids which hibernate in the brown-tail moth larvæ, *A. lacteicolor* and *M. versicolor*, were first described by VIERECK and WESMAEL in 1911 and 1835 respectively. A more complete description of the adults of both species is now given and their biology discussed in detail.

A. lacteicolor is of great importance as a means of control. It is such an efficient parasite that 20 to 25% of brown-tail moth larvæ in a web are often attacked. Its value is increased by the fact that, in America, it has several generations a year and is a more or less important parasite of the gipsy moth and other native injurious species. Moreover, *A. lacteicolor* destroys its hosts in their early stages, preventing them from doing any serious damage by considerably delaying their development. The weak point in the life cycle of *A. lacteicolor* is its evident dependence on the brown-tail moth for hibernation. The moth is now beginning to disappear so that *A. lacteicolor* is becoming gradually less abundant, thus materially reducing its parasitism on *Porth. dispar* and other native hosts.

M. versicolor is much inferior to *A. lacteicolor* as a parasite of the hibernating brown-tail moth larvæ of which it only destroys a small percentage. On some occasions cocoons of *M. versicolor* have been found in enormous numbers in serious brown-tail moth infestations, but these cases are rare. Moreover, parasitism on the almost full-grown brown tail moth larvæ is slight, and that upon native larvæ appears almost insignificant. The slight importance of this parasite as compared with *A. lacteicolor* is probably largely due to its dependence on the brown-tail moth for hibernation, and the fact that it, in its turn, is exposed to attack from various parasites. Another factor reducing the importance of this *Meteorus* is the frequent failure of the larvæ to transform to pupæ when they have spun cocoons. When *A. lacteicolor* larvæ occur in the same hibernating brown-tail moth larvæ as *M. versicolor* they cause the death of these latter.

AGRICULTURAL ECONOMICS

AGRICULTURAL CONDITIONS IN VICTORIA, AUSTRALIA

Victoria, the south-eastern State of the Australian continent, is still mainly an agricultural country, although, with the growth of the great city of Melbourne, which in 1916 contained one-half of the population of the State, her industries are becoming more and more important.

An overwhelming proportion of the wealth of Victoria is drawn from agriculture. The State, however, is still a stock farming rather than an arable, and still a sheep farming rather than a cattle farming country. In 1917 the values of the different products exported were: wool \$29,947,000, wheat and flour \$26,257,000, butter \$10,660,000, meat \$3,399,000, skins and hides \$2,672,000, leather \$2,141,000, tallow \$1,199,000, all other articles \$16,399,000.

While Victoria remains a stock farming country, its importance in this respect is gradually being overtaken by its importance as a producer of wheat and other crops. This is a natural consequence of the development of the State; as settlement becomes closer arable farming increases. Dairy farming has also been increasing of late.

CONTENTS OF THE INSTITUTE ECONOMIC BULLETIN

In addition to those already dealt with herein, the following is a list of the more important subjects treated in the November-December number of the International Review of Agricultural Economics. Persons interested in any of the articles in this list may obtain the original bulletin on application to the Institute Branch, so long as the supply for distribution is not exhausted.

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Co-operative Credit in Russia in 1917.	879-881
Insurance against Hail in Switzerland in 1916.	882-888
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Law as to Redivision of Lands in France.	933-937
Fixing of Agricultural Wages in England and Wales	938-939

AGRICULTURAL STATISTICS

FOREIGN CROP CONDITIONS

United Kingdom.—The weather in April was very unsettled and spring seeding backward. In the first part of May the weather was generally fine and good progress was made. The spring wheat acreage is expected to be smaller than for some time. Spring oats and barley are not expected to be a full average crop. The outlook for winter wheat is not altogether favourable, although latest reports show improvements. In certain sections of the country the scarcity of experienced labour has been detrimental. The area sown to winter wheat in Scotland is given as 70,000 acres compared with 79,000 last year.

France.—Spring sowings have been greatly hindered by the low temperature and cold rains. Weather, however, in the first half of May was generally favourable and work was being pushed actively. In the absence of seed wheat and oats large quantities of barley are being sown in parts. Early in May winter wheat and oats had an unfavourable appearance, but winter wheat has been greatly improved by the return of good weather. The area sown last fall to winter wheat, excluding occupied territory, has been

officially estimated at 11,087,000 acres against 11,360,000 last year. The area sown to winter wheat in Alsace Lorraine is given as 167,000 acres.

Italy.—Preparatory work as well as spring seeding was affected in average surroundings. The weather in early March was mild and dry, becoming cold and rainy later in the month, and on the whole was favourable for the growing crops. Cold and unseasonable weather was experienced in the first part of May. There were not many complaints of crop damage but the scarcity and dearth of labour hindered farm work. The estimated area sown to wheat is 11,355,000 acres compared with 10,868,000 last year and 11,800,000 acres the pre-war average.

Spain.—On the whole wheat prospects were excellent early in May although some fields had been flooded with rains and the excessive moisture hindered agricultural operations. The official estimate of the area sown to wheat is 11,318,000 acres against 10,233,000 in the previous year.

Central Europe.—Abnormally cold weather prevailed during April. On May 1st crop

conditions were reported as average in Germany.

Sweden.—Winter crops show good promise. Spring was late, but agricultural preparations were making fair progress in the first part of May. Recent precipitation proved beneficial.

North Africa.—It is expected that this year's harvest will be smaller than that of the previous year, but nevertheless the wheat crop will no doubt be of fair size.

Egypt.—Disturbances in this country resulted in damage to some of the Nile dams and much waste of water, which may seriously affect the growing crops.

India.—Official reports give the wheat area for the whole of India as 23,416,000 acres against 35,496,000 in 1918 and the yield as 278,000,000 bushels compared with 379,830,000 harvested in 1918, and 352,370,000 the average of the five years 1913-17.

Australia.—There was considerable rain early in May, and seeding prospects were fairly satisfactory.

Argentina.—Heavy rains were general in the last part of April, and the moisture, though unfavourable for maize, was putting the land in good working order for preparation for the next wheat crop. On May 1st the weather had improved.

THE UNITED STATES MAY CROP REPORT

The United States Department of Agriculture estimates the winter wheat crop for 1919, based on condition on May 1st, at 899,915,000 bushels compared with 558,449,000 bushels last year, and the previous record crop in 1914 of 684,990,000 bushels.

Production of rye was estimated at 122,946,000 bushels compared with 89,103,000, the actual production in 1918.

AREA AND PRODUCTION OF CEREALS IN FRANCE

(Exclusive of invaded territory)

Products	Areas			Production		
	1918	1917	Five years' average 1912-16	1918	1917	Five years' average 1912-16
	Acres	Acres	Acres	Bushels	Bushels	Bushels
Wheat	11,360,000	10,357,000	14,180,000	233,784,000	134,576,000	256,353,000
Rye	1,942,000	1,834,000	2,508,000	29,885,000	24,650,000	39,846,000
Barley	1,396,000	1,700,000	1,690,000	28,104,000	37,266,000	41,186,000
Oats	7,227,000	7,308,000	8,502,000	177,763,000	201,658,000	275,130,000
Corn	841,000	847,000	1,037,000	8,743,000	14,904,000	20,277,000

IMPORTS AND EXPORTS OF WHEAT AND FLOUR

(Flour expressed in equivalent quantities of wheat)

(Thousands of bushels)

Countries	Imports				Exports			
	February		First two months (1 Jan. to 28 Feb.)		February		First two months (1 Jan. to 28 Feb.)	
	1919	1918	1919	1918	1919	1918	1919	1918
Great Britain and Ireland..	5,440	11,408	24,835	20,213	22	21	61	67
Italy.	5,681	4,000	12,712	7,563	63	20	163	28
Canada.	7	3	7	6	4,149	9,574	14,313	18,066
United States.	423	387	1,229	8,118	15,842	10,496	37,945	22,937
Argentina.					2,927	3,007	6,693	7,878
India.					97		294	
Japan.	61	10	294	14		866		1,221
Egypt.	94	60	238	78		27		29
Tunis.	2		2		27	26	62	29

LIVE STOCK STATISTICS

DENMARK

Classification	Number		Increase(+) or decrease (-)	
	15th July 1918	12th July 1917	Differences	Percentage
Horses.....	544,998	572,412	- 27,413	- 4.8
Milch Cows.....	924,417	1,147,183	- 222,766	- 19.4
Other Cattle.....	1,199,305	1,310,975	- 111,670	- 8.5
Sheep.....	470,051	480,007	- 9,956	- 2.1
Goats.....	41,411	32,112	+ 9,299	+ 29.6
Pigs.....	620,880	1,650,623	- 1,029,743	- 62.0
Poultry.....	9,883,692	12,287,795	- 2,404,103	- 19.4

SWITZERLAND

Classification	Number		Increase(+) or decrease (-)	
	19th April 1918	19th April 1916	Differences	Percentages
Horses.....	128,644	136,836	- 8,192	- 6.0
Mules.....	3,056	3,079	- 23	- 0.7
Asses.....	1,640	1,288	- 352	- 19.3
Cattle.....	1,530,165	1,615,893	- 85,728	- 5.3
Pigs.....	364,468	544,563	- 180,095	- 33.1
Sheep.....	225,081	172,938	+ 52,143	+ 30.2
Goats.....	354,716	358,887	- 4,171	- 1.2
Beehives.....	204,128			

LUXEMBURG

Classification	Number		Increase(+) or decrease (-)	
	8th Nov. 1918	18th Oct. 1917	Differences	Percentages
Horses.....	17,012	17,282	- 270	- 1.6
Milch Cows.....	53,264	54,190	- 926	- 1.7
Other Cattle.....	54,740	60,087	- 5,347	- 8.8
Sheep.....	5,578	4,334	+ 1,244	+ 28.8
Pigs.....	94,957	113,671	- 18,714	- 16.5
Goats.....	15,196	13,951	+ 1,245	+ 8.9
Rabbits.....	45,434	72,567	- 27,133	- 37.4
Beehives.....	10,431	11,839	- 1,408	- 11.9
Poultry.....	316,522	345,128	- 28,606	- 8.3

TUNIS

Classification	Number		Increase(+) or decrease (-)	
	30th April 1918	30th April 1917	Differences	Percentages
Horses.....	35,831	32,960	+ 2,871	+ 8.7
Mules.....	16,236	15,028	+ 1,208	+ 8.0
Asses.....	84,639	77,051	+ 7,588	+ 9.8
Cattle.....	251,490	224,912	+ 26,578	+ 11.8
Sheep.....	1,124,998	1,033,173	+ 91,825	+ 8.9
Goats.....	548,912	459,634	+ 89,278	+ 19.4
Pigs.....	14,596	10,144	+ 4,452	+ 43.9
Camels.....	105,037	111,027	- 5,990	- 5.4
Poultry.....	400,171			
Beehives.....	220,000			

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July, 1919

DOMINION OF CANADA
DEPARTMENT OF AGRICULTURE

The Agricultural Gazette of Canada

EDITOR: J. B. SPENCER, B. S. A.

Issued by direction of
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Acting Minister of Agriculture

OTTAWA
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OF CANADA

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ORGANIZED LIVE STOCK MARKETING

MORE than seven thousand car loads of live stock were marketed co-operatively by the farmers of five provinces in Canada last year and this system is only commencing. This augurs well for the live stock industry which is entering upon a period of unprecedented development. The world is very short of its live stock needs. Canada, according to official statistics, has only six head of cattle to the hundred acres of land used for farming purposes, whereas the United States and Australia have eight, Italy ten, France twelve, Great Britain and Germany sixteen, Denmark twenty-five, and Holland twenty-nine head. Canada's position in the ranks of hogs and sheep is also very low as compared with many other countries. The hope of continued prosperity in Canada depends upon the success of the farming industry, and it is recognized that live stock is the very basis of agricultural welfare.

The co-operative marketing of live stock has made greatest progress in the Prairie Provinces. Dotted over the country from Winnipeg to the Rockies local live stock shipping associations are in operation. Many of these are associated with the Grain Growers' movement, but in Saskatchewan more especially stock marketing associations incorporated under The Agricultural Associations' Act are doing business on an extensive scale. In Ontario from two hundred to two hundred and fifty organizations are shipping. Many of these organizations had their origin in farmers' clubs, while others began under the auspices of the United Farmers' Association. In Quebec the Cheesemakers' Agricultural Co-operative Association markets all classes of commercial live stock, while the live stock associations handle breeding stock. In the provinces farther east co-operative marketing has been applied more especially to sheep and lambs. It is fair to assume that at a comparatively early date much of the live stock of Canada will be marketed by the farmers themselves, who, through the system, will become familiar with the methods and principles of marketing and will thus be encouraged to so improve and finish their animals as to reap the full value of their efforts.

In Part II of this number of **THE AGRICULTURAL GAZETTE** the co-operative marketing of live stock as it is carried on in most of the provinces, is reviewed by officials intimately associated with the movement.

MUSK OX AND REINDEER INDUSTRY

UNDER the provisions of Part I of the Enquiries Act, Chap. 114 of the revised statutes of Canada, a Commission has been appointed to investigate the possibilities of the Canadian North as a permanent meat and wool producing area. The Commission consists of Dr. J. G. Rutherford, Railway Commissioner, Ottawa; Messrs. J. S. McLean, Manager, Harris Abattoir Company; J. B. Harkin, Commissioner of Dominion Parks, and Vilhjamur Stefansson, Explorer. Dr. Rutherford is appointed Chairman. The Commission, which is authorized to employ with the approval of the Governor-in-Council such assistants as its members may determine, shall receive no remuneration except expenses. The Commission is expected to report with the least possible delay upon the feasibility of the propositions mentioned in the memorandum which follows, together with recommendations in regard to the best methods to follow to bring about efficient development in case it is found conditions warrant action on the part of the Government.

THE MEMORANDUM

Special attention has recently been directed to the potentialities of the Arctic and sub-Arctic regions of Canada as a grazing country. It is represented that in these regions there is an abundant growth of vegetation in the summer which forms nutritious food for grazing animals in winter as well as summer. It is estimated that there are at least a million square miles of such grazing grounds

in northern Canada. The winter climate of these areas is too severe for ordinary domestic cattle but musk ox and reindeer can graze there in the open the year round. The dimensions of the reindeer industry in Lapland and in Siberia and the great development of the reindeer herds of Alaska suggest that corresponding development can reasonably be anticipated with respect to northern Canada. In this connection it is pointed out that herds of barren land caribou aggregating, it is estimated, twenty to thirty million animals frequent northern Canada, and that biologically these animals are practically identical with reindeer.

Vilhjalmur Stefansson, the Arctic Explorer, is convinced that the musk ox can be readily domesticated and has urged that steps be taken in that connection with the object of developing herds for commercial purposes.

The development of large reindeer and musk ox herds in northern Canada will represent a very important addition to the meat production of the Dominion. The development of musk ox herds will represent not only an addition to the meat production, but also to the wool production. The value and attractiveness of reindeer flesh for food purposes is well established. In regard to musk ox meat Mr. Stefansson claims it is practically indistinguishable from beef.

In all parts of the world there is a constant reduction of grazing areas through the development of such areas for field crops and in consequence the meat and wool problems are every year becoming more acute.

The Arctic and sub-Arctic regions of Canada lie too far north to be included in the lands suitable for the profitable cultivation of cereals and therefore may be regarded as permanent grazing areas.

In view of the foregoing the Minister considers that there are good grounds for believing that the Canadian North may become a great permanent meat and wool producing area and that a commission should be appointed for the purpose of making a thorough investigation into the subject from a business and national standpoint and to report their finding.

FIBRE FLAX SEED ORDER RESCINDED

THE order-in-council of October 23rd, 1918, commandeering all fibre flax seed in Canada for shipment to Ireland is rescinded by an order passed May 26th, 1919. All surplus fibre flax seed has already

been shipped to Ireland to be grown for fibre for the manufacture of aeroplane cloth for the allies. Thus the order has been rescinded because the purposes for which it was passed have been accomplished.

PART I

Dominion Department of Agriculture

THE EXPERIMENTAL FARMS

DIVISION OF BOTANY

"TAKE ALL," "FLAG SMUT" AND "EAR COCKLE" OF WHEAT.

SOME short time ago the presence of "Ear cockle" was reported in wheat fields of the State of Virginia. This is now followed by a report that "Take all" and "Flag smut" occur in Madison County, Illinois.

Two of the diseases above referred to are well known in Europe ("Take all" and "Ear cockle"); but all three also occur in Australia; not until very recently have any of these troubles been recorded on this continent.

"Take all" has now been definitely located in several counties in Illinois and Indiana. It is doing the greatest damage in Madison County in Illinois, where it has been found in at least 100 fields representing 1,000 acres. In Mason County, Illinois, it has been observed in eleven fields comprising about 250 acres.

"Flag smut" of wheat has been collected only in Madison County, Ill., where it occurs in many of the same fields with "Take all."

Considerable apprehension has been felt for some time lest these diseases might gain entry and a foothold on the Continent of America through the importation of Australian wheat, though how this assumption is justified in the case of "Take all" is not quite clear. So far as we know none of these diseases has been observed in Canada, although some records exist of a disease, or the initial stages

of a disease, found some years ago in Saskatchewan very closely resembling "Take all." Should any of these diseases become permanently established in the States, it would be an important matter to be forewarned in Canada and to become familiar with the appearance of these diseases, so that they may be recognized at once.

As is the case with new diseases or those of foreign origin, it is often argued that because they are being introduced into new environments they may assume a very serious role and cause immense damage. Likewise, naturally, these troubles may not find conditions congenial and may disappear rapidly. Either theory may become fact, so it is well to be on the safe side and bear in mind what undesirable results may follow, as in some cases they have followed, the introduction of new diseases. Among the three new troubles "Take all" has quite a record as a destructive wheat disease, more particularly in Victoria, Australia. C. C. Brittlebank, the economic botanist of the Department of Agriculture of Victoria, expresses his opinion in the March, 1919, number of the *Journal of Agriculture for Victoria*, as follows:

"Of all the fungous diseases affecting wheat "Take all" is the most destructive, and the actual loss caused by it is far greater than by any other single disease, Rust included, or perhaps by a combination of all

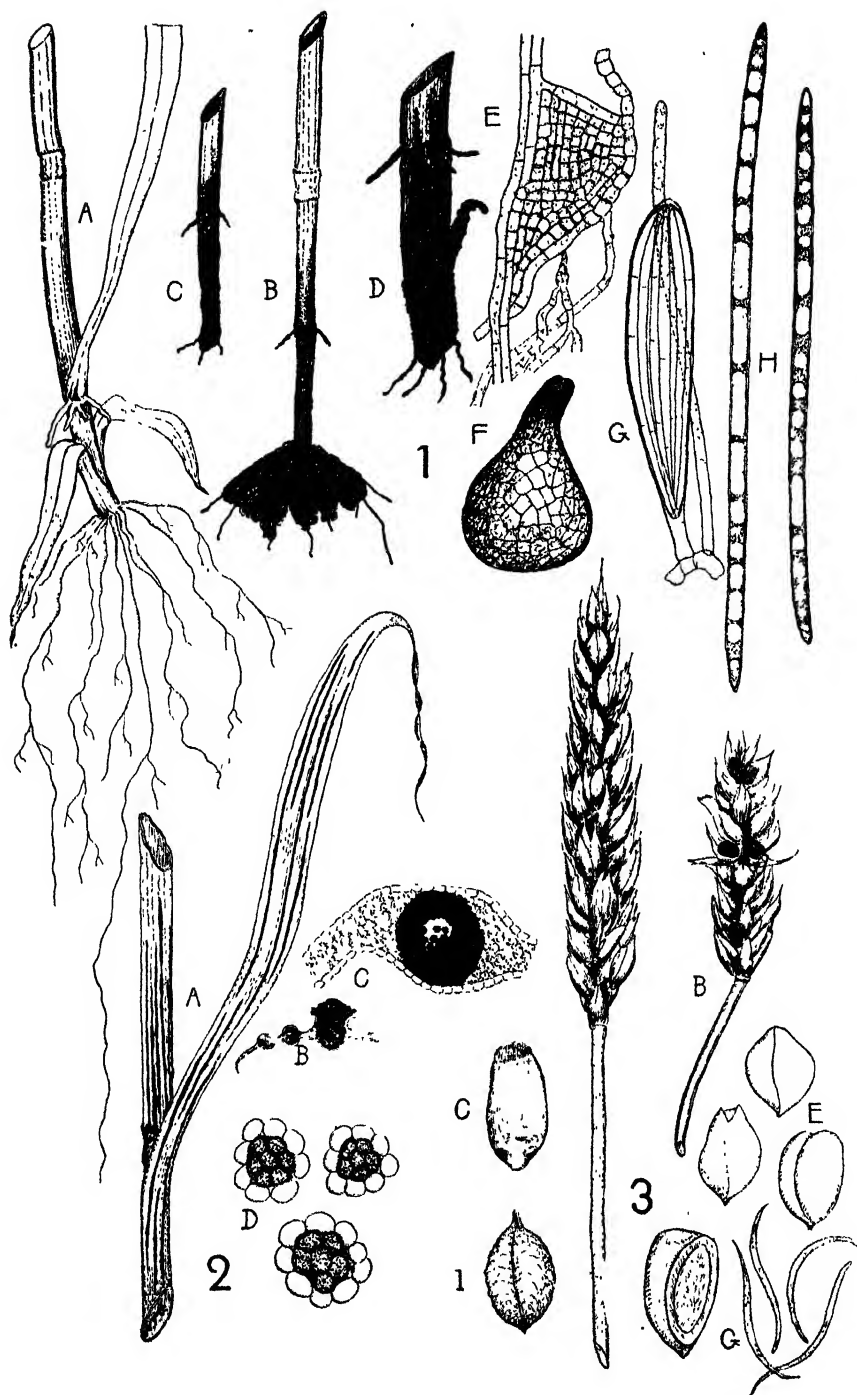


Fig. 1, A-H. Take all Wheat.
 Fig. 2, A-D. Flag Smut of Wheat.
 Fig. 3, A-G. Ear Cockle of Wheat.
 (For explanation see Text.)

known fungous diseases affecting wheat. Rust, when present in epidemic form, causes more widespread loss for the one season but fortunately it appears only once in a series of years, while "Take all" is always with us [Australia] destroying a few plants here, thousands there, and nearly the entire crop in other places."

"Take all" is essentially a disease of the basal portion and root system of a number of cultivated and wild grasses, but is economically of greatest importance when attacking cereals.

The trouble is most prevalent on badly drained land, but should not be confused with the turning yellow of young grain plants growing in soggy patches of fields, a phenomenon which is not uncommon in many grain fields of Eastern Canada. The rapidity with which spring sets in occasionally does not allow land that is not level or well-drained to dry up evenly, and wet spots generally exist when the seed comes up. The effect of the hot sun upon the roots of the young plants growing in such places produces an injury known as "cooking" of the roots. As a result, the plants will turn yellow but will eventually recover as secondary roots are produced.

In "Take all" there may occur yellow patches in the field, but the affected plants rarely recover, since their primary roots as well as their secondary ones are killed by the causal fungus.

In the localities of the United States where the disease has recently been observed the following note summarizes the appearance of the disease:—

"Take all" on the small wheat plants may be recognized by the browning and rotting of the stems above the first node or crown. The blades become a dark colour exhibiting a bluish tinge. As the rotting continues new shoots are sent out from the crown which give the diseased plants a thick rosetted appearance. These new shoots become diseased and another crop of tillers are sent out unless the death of the plant has occurred previously. Diseased plants are usually found in definite areas unless the entire field is affected, although in no case has it been reported that every plant in a diseased area is rosetted. It is the rule to find short thick rosetted plants growing at the foot of taller

plants which may be ready to head out. These diseased plants are very easily broken off just above the first joint."

These observations differ somewhat from our experience with the disease in Europe in so far as the dark green colour and tillering are concerned, but careful note should be made of them since they may be helpful in recognizing the appearance of this disease in the Continent of America.

Generally speaking, this disease occurs on individual plants scattered throughout the field. In these cases the wheat plants that are affected reach only about two-thirds of the normal height, the plants look prematurely ripe, but in reality they are blanched and their ears remain unfilled.

According to the time of attack, there may be found plants in all stages of growth affected by this disease. On examining the roots and the base of the stem of affected plants, mycelium is found abundantly present.

Figs. 1. A-H of the accompanying plate illustrate the symptoms of "Take all" together with the causal fungus. The disease is due to a microscopic fungus to which the technical name *Ophiobolus graminis* Sacc. has been given.

Fig. A. shows the basal portion of a sound wheat plant, when pulled up by the roots. The roots are long and slender, the upper or secondary roots are juicy and white in colour, the lower portion of the stem shows no discolouration. It would require a firm pull to root up such a plant.

Fig. B. shows the basal portion of a diseased plant. Here the plant comes up without effort, the roots are gone and the numerous root hairs generally retain a quantity of soil, which is not readily shaken loose. The primary roots are killed, the secondary roots above show signs of decay. The stem shows the very typical brown to black discolouration extending to about 1½ inches

above ground. On removing the enclosing leaf sheaths, this discoloration becomes most pronounced. Fig. D shows the stem "C." slightly magnified. This enables us to observe the felty moss-like covering of the basal portion of the stem, which is easily peeled off. This layer of felt consists of the hyphae of the fungus. They are dark brown when mature, and fairly thick-walled and stout when seen under a microscope (Fig. E.) In this mass of hyphae are embedded the very minute globular fruiting bodies of the fungus, one of which is shown enlarged in Fig. F. The fruiting bodies are really receptacles or bags (perithecia) containing each a number of very small tubes or sacs, (asci) (Fig. G.) kept separate from each other by a number of very slender hair-like tubes (paraphyses). Each spore sac contains eight spores. These spores are long needle-shaped and hairlike in appearance. Fig. H. shows two spores very highly magnified; when mature they show from three to many dividing walls or septa.

The fungus attacking essentially the basal portions of the plants, remains fully intact when the crop is cut, and the stubble of an affected field produces a large number of fruiting bodies and reproductive spores. In general practice the stubble is ploughed under. This does not kill the fungus, however, which will shed its spores in the soil and attack any suitable host plant that may be sown the following spring.

So far there has been no actual experience of this disease in Canada. It would, however, seem that the destruction, where possible, by fire of the stubble soon after the harvest would greatly reduce the infective material. If this practice is followed by fall ploughing and summer fallow, kept well cultivated, it is possible that the disease will not have much chance.

"Flag smut" is a leaf disease, frequently involving the stem also.

The fungus produces at first long grey swollen stripes pushing from within the leaf tissue against the colourless cells of the epidermis; later these stripes burst open lengthways and the dark fungus spores appear as a powdery smutty substance on the surface of the stripes. While these stripes are most characteristic symptoms of this disease, the leaves of affected plants are peculiarly twisted and gnarled around the stem, preventing the production of ears. Where these symptoms exist there is little doubt of the identity of the disease.

"Flag smut" is due to a parasitic fungus (*Urocystis tritici* Koern.), and, while it has a similar popular term, it is unlike any other smut attacking wheat. A "Flag smut" of rye is fairly common in Canada and closely resembles the "Leaf smut" of wheat, yet the former is due to a different species, viz: *Urocystis occulta* Rab.

Figs. 2 A-D illustrate the symptoms of this disease. In "A" the long stripes are plainly seen on leaf and stem. In Fig. "B" a transverse section is represented through a leaf blade showing to the left two stripes still covered by the epidermis, while a third one has ruptured this skin and the spores have become free. Fig. C. shows one of the infected leaf portions highly magnified showing the dense mass of spores with which the interior is filled. Fig. D. shows a number of the characteristic *Urocystis* spores very highly magnified.

These spores are well protected by a layer of sterile colourless cells enabling them to retain their power of germination for a considerable time. Contact of seed with smutted straw infects the former, whether this contact occurs already in the field, or in threshing, or at any later period. The spores merely adhering to the surface may be killed by seed treatment with formalin or bluestone, but seed treatment does not act as a preventive when the seed is sown in infected soil. Soil infection is

source of real danger and a great drawback to control. In Australia, a three year rotation is practised, with wheat only once every three years. It is also said that stable manure serves as a means of causing soil infection, and its use should be carefully guarded against in localities where the disease has occurred. In bad cases it is best to burn the infected straw at once.

The third malady on this list, known as "Ear cockle," is essentially a trouble affecting the ear of wheat. The injury is caused by a minute eelworm (*Tylenchus tritici* Bastian), which produces in place of grains, hard purple-black galls, similar in size to a normal grain, but quite different in shape and colour.

Fig. 3A. represents a normal ear of wheat; in "B." is represented an affected ear of the same variety showing the peculiar ruffled spread-out appearance of the affected ear and revealing a number of the eelworm galls within the covering glumes. The number of galls produced in one head varies from one to the total number of grains that would have been normally produced.

For comparison our Fig. C. represents a normal grain of wheat, while "D." shows the appearance of a smut ball with which the gall should not be confused. A smut ball may be readily crushed between finger and thumb when the spore dust will appear, its covering is thin and its odour pungent. In "E" we find three galls or ear cockles, which will be seen to differ considerably from a smut ball in appearance. They are generally deep purple or purplish-black and require considerable pressure to crush them between the fingers. They are more like a minute nutlet with a hard shell, though void of a kernel.

The interior of the ear cockle is hollow, but filled with a fine mealy substance which is almost entirely composed of the bodies of minute eelworms. (Figs. F. and G.) The longevity of these worms is said

to be truly remarkable; some observers claim that, although ear cockles were kept in a dry condition for fifty years, the worms were still alive. Whether this observation is correct we have not been able to confirm from our own observation, but at any rate the presence of ear cockles in wheat will render such grain unfit for seed purposes until they are removed. On being sown with seed grain, the shell of the ear cockles becomes softened and decays, the active eelworms push their way out into the soil and reach young seedling plants on which they live without causing serious damage, although affected plants are yellow in colour, until they reach the young ears where they commence their destructive work. The infection most likely takes place already in the very young and tender ear. In Europe, infected seed grain is subjected to various treatments, in order to remove the ear cockles. A considerable number may be removed by sifting or by immersing the seed in water, or in salt solutions, when the ear cockles rise to the surface and may be skimmed off. Care should be taken to prevent removed ear cockles from reaching manure piles or infecting land. They should be burnt up immediately. The eel worm may live for a time in the soil, hence too rapid succession of wheat should be carefully avoided. Treatment with bluestone or formalin has not been of any use; it is possible that hot water treatment with certain modifications may have better results.

In concluding the above notes, the Division of Botany expresses the hope that all farmers and technical observers will keep on the look-out for these troubles. The sooner remedial measures are applied, the less the chance of these diseases causing serious harm. Suspicious specimens should be promptly forwarded for examination. If addressed to the Dominion Botanist, Central Experimental Farm, Ottawa, packages below 12 oz. in weight do not require postage stamps.

DIVISION OF ANIMAL HUSBANDRY

THE VALUE OF THE PURE BRED DAIRY BULL IN THE GRADE HERD

BY E. S. ARCHIBALD, B.A., B.S.A., DIRECTOR, EXPERIMENTAL FARMS

DURING the past seven years a great deal of attention has been given this subject by the Dominion Experimental Farms; and many experiments of this nature are now under way. As it takes many years to accumulate very

accurate information on this subject the results of a reasonably definite nature are only now obtainable from a few farms. Following is a list of farms and stations where this work is being conducted;—

Experimental Farm or Station at:—	Class of Female Foundation.	Breed of Bull Used.
Nappan, N. S.	Good grade heifers	{ Ayrshire. Holstein. Guernsey. Ayrshire.
Fredericton, N. B.	Average grade cows. . . .	{ Holstein. Shorthorn.
Ste. Anne de la Pocatiere, P.Q..	Average grade cows	Ayrshire.
Cap Rouge, P.Q.	Good grade cows.. . . .	French Canadian.
Spirit Lake, P.Q.	Average grade cows	Ayrshire.
Ottawa, Ont.	Excellent grade cows... . .	{ Ayrshire. Holstein.
Kapuskasing, Ont.	Good grade cows.. . . .	Ayrshire.
Lacombe, Alta.	Common grade cows and good grade heifers	Holstein.
Agassiz, B.C.	Good grade cows	Holstein.

Many factors have entered into these experiments which prohibit definite deductions to date. However the following summaries show progress and warrant considerable study.

TWO points must, in fairness to younger cows and heifers, be kept in mind, namely;—

1. During the war feeds were difficult to obtain, hence younger generations did not have as good an

opportunity as their dams at the same age.

2. These grade herds have increased rapidly and the greater numbers in itself would usually mean slightly lower production, but with war conditions of labour and feeds, with pasture shortage and similar items, there is a considerable margin of error which may be corrected during the coming year.

NAPPAN, N.S.

Experiment Established, 1911.

Summary to April 1st, 1919.

In the year 1911, eleven good grade yearling heifers representing good grade dairy heifers of this part of Nova Scotia, were purchased as a foundation. Only nine of these were used in the experiment. These turned out to be very good heifers

which made good records, decidedly above the average production of grade heifers in Eastern Canada. During the first three years these foundation heifers were bred to Ayrshire, Holstein and Guernsey bulls, dropping eight, six and three heifers respectively. This was again repeated in the next three years and four, three and three heifers of similar

breeding resulted. The heifers and their progeny have been bred continuously to bulls of the same breed as their sire.

During the seven years a large herd of good grade cows has resulted all springing from the nine grade heifers, and all sired by pure bred bulls. No crossing of breeds was done.

When the experiment was started there was ample pasture for the foundation heifers and first crop of calves only, but the immediate extension of pasture lands was anticipated. However, owing to war conditions no extensions materialized. Hence, the production in summer did not increase over heifer records with the foundation cows as it should have and each successive crop of heifers in milk made matters worse and did not show the advance in records proportionate with the improved breeding.

Each crop of heifers was bred to freshen at the same age and season of the year as the foundation heifers. Had pasture been available this would have made an ideal comparison, but as it was the increasing shortage of feed was an extra handicap to each successive crop of better bred heifers.

A striking point brought out in this work to date is the transmission by the bulls of different breeds of the dairy type, colour and other breed characters.

The mass of data so far collected is of such bulk that only a brief

summary is here possible. The most outstanding features to date are as follows:—

1. Foundation grade heifers made excellent two year old records, but have not materially increased these as mature cows owing to above mentioned reasons.

2. The first cross Ayrshire heifers (first crop calves from foundation heifers by Ayrshire bull)—50 per cent Ayrshire blood, as two year olds 71.4 per cent exceeded their dams' records at same age, 28.5 per cent as three years olds exceeded their dams at same age, 14.2 per cent at four years exceeded dams and 33.3 per cent at five years exceeded dams.

3. The second cross Ayrshire heifers (daughters of first cross Ayrshire)—75 per cent Ayrshire blood, as two year olds 25 per cent exceeded their dams records at the same age, as three year olds again 25 per cent were superior and as four year olds 33.3 per cent were superior to their dams.

Compared with the foundation heifers at three years old the second cross heifers showed 33.3 per cent superior to grand dams.

4. The third cross Ayrshires,—87½ per cent Ayrshire blood,—have not as yet had a fair chance for comparison, but to date have not excelled their dams to any appreciable degree.

5. The first cross Holstein heifers (first crop calves from foundation heifers by Holstein bull).—50 per cent Holstein blood, as two year olds 50 per cent exceeded their dams at same age, as three year olds 16.6 per cent exceeded dams at same age, as four year olds 16.6 per cent exceeded dams at same age. This is not as great improvement as with the first cross Ayrshire heifers which may be due to the fact that the bull was not as good a dairy sire, but more apt to be due to the decreased pasture per head and consequent poorer summer feeding.

6. The second cross Holstein heifers, 75 per cent Holstein blood, as two year olds 66.6 per cent exceeded their dams at the same age, which is a material advancement over Ayrshire heifers of similar breeding.

FREDERICTON, N.B.

Experiment Established, 1915.

Summary to April 1st, 1919.

1. The foundation cows were representative of the average grade dairy cow in the district.

2. The first table gives the record of foundation cows—*mature age*—the second year in our possession and after the first crop of calves (grade Holsteins) were born.

3. The second table gives the record of the *Holstein heifers* from foundation cows as *two year olds*. A comparison shows that these heifers produced 2% more milk and as much fat as their dams at maturity. As three year olds these heifers are producing 30% more to date than as two year olds, and it is safe to predict that they will produce at least 33% more than their dams when mature.

4. Table three shows the foundation cows again as *Mature* to date in present lactation.

5. Table four shows their second

crop of calves by a Shorthorn bull as *two year olds* in their present lactation to date in which they are equal to their dams at maturity.

SUMMARY DAIRY CATTLE GRADING EXPERIMENT TO APRIL 1, 1919.
FREDERICTON, N.B.

TABLE I.

Class of Cows—Common grade at mature age.	Number of days milking	Lbs. milk.	p.c. fat.	Lbs. butter 85 p.c.
Brindle	300	5582.2	4.7	257.6
Bessie	229	4480.9	3.8	200.5
Brownie	262	3623.8	4.2	177.7
Madge	173	3442.7	3.8	151.5
Tiny	274	5075.3	3.4	205.0
Hannah	229	4521.9	3.7	199.3
Average six head	244.5	4454.47	3.9	198.6

TABLE II.

Class of Cows—1st crop from grades, Holstein sire as 2 yr. olds.	Number of days milking	Lbs. milk.	p.c. fat.	Lbs. butter 85 p.c.
Brindle 1-H	355	* 6179.1	4.1	294.78
Bessie 1-H	290	3337.2	4.5	179.18
Brownie 1-H	366	* 5497.8	3.6	229.21
Madge 1-H	287	* 4493.6	3.2	158.20
Tiny 1-H	289	3528.9	3.6	148.17
Hannah 1-H	301	4234.4	3.6	180.70
Average six head	314.7	4545.2	3.8	198.37

*.—Heifers at two years exceeding their dams' records at maturity.

TABLE III.

Class of cows—Common grades at maturity present lactation.	Number of days Milk to date.	Lbs. milk.	p.c. fat.	Lbs. butter. 85 p.c.
Sally	68	1822.0	4.3	91.40
Brindle	92	2958.3	4.3	148.99
Maggie	6	1454.4	3.9	64.27
Shannon	71	1798.0	3.7	79.06
Blossom	91	2592.7	3.8	115.74
Quennie	70	2360.5	3.3	96.94
Average six head	76.5	2164.3	3.9	99.40

TAB E IV.

Class of Cows—2nd crop from grades, Short-horn sire as 2 yr. olds present lactation.	Number of days milk to date.	Lbs. milk.	p.c. fat.	Lbs. butter. 85 p.c.
Sally 1-S.	82	* 2620.0	3.7	113.83
Brindle 1-S.	85	1629.0	3.7	70.18
Maggie 1-S.	64	1427.8	4.2	64.90
Shannon 1-S.	68	* 1881.3	3.9	89.13
Blossom 1-S.	78	2296.6	3.6	95.88
Queenie 1-S.	78	* 2858.8	3.5	118.10
Average six head	75.8	2118.9	3.8	92.00

*.—Heifers at two years exceeding the dams' records at maturity.

OTTAWA, ONT.

Experiment Established, 1913.

Summary to April 1st, 1919.

1. The foundation grade cows were the best obtainable grade Ayrshire and Holstein cows, equally divided, and *all mature*. It was expected that the rearing of daughters superior to their dams would be difficult.

2. The loss of buildings by fire in 1913 and other circumstances later necessitated disposing of many foundation cows. This coupled with

the fact that the majority of calves dropped during the first two years were bulls delayed progress.

3. Only two original cows have daughters which have completed one or more full lactation periods, details of which are given herewith. At present several heifers both Ayrshire and Holstein grades are completing two year old records, many exceeding 10,000 lbs. milk and all equal to or superior to the average mature record of their dams.

Name.	Class of cow.	Age.	No. days milk.	Lbs. milk.	p.c. fat.	Lbs. butter 85 p.c.	No. of Lactations avge.
1. Diamond.	Grade holstein	Mature. . .	368	11389.	3.41	457.2	3
2. Johanna.	"	Mature. . .	234	6415.	3.34	252.4	1
3. Diamond A.	Daughter of above	2 and 3 yrs.	398	10316.	3.66	446.7	2
4. Johanna A.	by holstein sire	2 and 3 yrs.	316	7554.	3.95	350.5	2

LACOMBE, ALTA.

Experiment Established, 1913.

Summary to April 1st, 1919.

1. The foundation cows are in two groups, namely:—

A. High class Holstein Grades.

B. Common mature cows representative of the average grade cows in Central Alberta.

2. The following tables are self-explanatory. It will be seen that for both groups the progeny by a

pure bred sire as two year olds calves during this experiment has produce almost as much as their hindered greater progress, but another dams at maturity. year will see a marked increase in records of progeny.

3. The large percentage of bull

Name.	Class of cow.	Age, years.	No. days in milk.	Lbs. milk.	p.c. fat.	Lbs. butter. 85 p.c.	No. of milking period ave.
No. 17.....	High grade hol-						
	stein grades ..	3 and 5...	461	8513.5	4.2	424.8	2
No. 20 ...	"	4-5-6-7...	393	9006.0	3.31	359.0	4
No. 19	"	3-5-6 ...	390	7728.7	3.38	307.3	3
No. 42 (16A)...	Daughter of above						
	by holstein sire	2	346	9110.2	3.4	362.5	1
No. 41 (17A)...	" "	2	324	7725.0	3.6	313.2	1
N. 47 (20A)...	" "	2	304	5815.9	3.28	221.8	1
No. 54 (19A)...	" "	2	451	8482.0	3.23	322.3	1

Name.	Class of cow.	Age, years.	No. days in milk.	Lbs. milk.	p.c. fat.	Lbs. butter.
No. 4.....	Common cow.....	Mature	192	3054.5	3.32	101.5
No. 33.	"	"	317	4401.3	3.31	171.3
No. 34.	"	"	491	8491.3	4.48	393.2
Average all.....	Lactations for three.....	"	295	4800.3	3.65	224.8
No. 49 (4A). ...	Daughters of above cows... by Holstein sires.	2	193	1570.2	3.1	57.4
No. 44 (33A)....		2	414	4869.7	3.42	195.8
No. 34 (34A)....		2	220	3356.2	3.53	139.3
Average 1.	Lactation each.....	2	275	3265.4	3.35	130.8

AGASSIZ, B.C.

Experiment Established 1913.

Summary to April 1st, 1919.

1. A number of excellent high grade mature cows were among the original 18 foundation cows, hence progress is sure to be slower than with a foundation of poor cows.

2. During the years 1915, 1916 and 1917 the cows were used for feeding experiments which would

account for lower relative production than 1914.

3. The first sire used in this work had not the same relative excellence in type and records, as the grade females, although a fairly good bull.

4. In the year 1915-16 the records of several two year old heifers from the original cows, and by unknown sires, are included in the 18 cows reported.

5. It was necessary to reduce the number of cows in 1916-17 in order to accomodate the young stock. In this year, too, heifer records are included—in consideration of which a marked increase in production is evident.

6. In the year 1917-18 all the original excellent foundation females gone. This year's records consist

of the daughters of these cows, the majority of which are two year old records. Hence in another two years when these animals are mature the grade herd should show milk production fully 30% higher than the foundation herd.

7. Much higher class bulls are now being used so it is expected that progress will be still greater.

Period and number of cows.	Number days in milk.	Lbs. milk for period.	Daily milk yield lbs.	p.c. fat.	Lbs. fat for period.	Lbs. butter for period.
1913-1914, 18 cows	294.6	7628.2	25.89	3.51	268.12	335.15
1914-1915, 17 cows.	325.	7281.4	22.4	3.35	244.39	305.48
1915-1916, 18 cows.	338.3	7241.1	21.4	3.24	234.68	293.35
1916-1917, 9 cows.	341.77	7620.7	22.29	3.23	247.67	309.6
1917-1918, 20 cows	350.6	7972.56	22.76	3.34	266.67	333.33

CEREAL DIVISION

A SUFFICIENCY OF GOOD SEED

BY C. E. SAUNDERS, PH.D., DOMINION CEREALIST

IT CERTAINLY seems highly desirable to greatly extend the work which has already been done in the effort to provide a sufficient quantity of pure and good seed grain of the best varieties and to elaborate a system of seed production which would guard the country as far as possible from some of the disasters which have overtaken it in the past. I have not enough information about the number and strength of the agricultural societies in the various provinces to enable me to express an intelligent opinion as to the possibility of their effective co-operation in such a scheme as Professor Bracken outlines. I do not think, however, that such co-operation, however desirable, would be essential for the solution of the problem we are considering.

It would seem to me that the best plan would be to operate the system of seed grain production under Dom-

inion control, because the Cereal Division of the Experimental Farms has been, for many years, in the lead in the production of high class seed, because many of the prominent varieties were originated here, and because the branch experimental farms would form convenient places for the propagation of the highest class of material entirely under expert supervision. Furthermore, crop failures are never Dominion-wide; and under a centralized system seed grain could easily be sent from one province to another in case of need.

To put such a plan in operation would however require a considerable enlargement of the scope of the Cereal Division at both the Central and Branch Farms, as at present nearly all of the comparatively small quantity of seed grown which we now produce is required for our own farms and for our annual free sample distribution.

THE ENTOMOLOGICAL BRANCH

THE GREENHOUSE LEAF-TYER (*Phlyctænia ferrugalis* Hbn.)

BY ARTHUR GIBSON, CHIEF ASSISTANT ENTOMOLOGIST

THE Greenhouse Leaf-tyer, an European insect, has during recent years increased to a serious extent in many greenhouses in eastern Canada. The first Canadian record we have of injury by the caterpillars refers to an outbreak which occurred in a large greenhouse in Toronto, Ont. The actual year of introduction is not known, but it is thought that this was in 1896 or 1897. The outbreak was personally investigated by the writer in 1899. Since this latter year the leaf-tyer has been found at other points in the province of Ontario, and we also have reports of injury from various points in the provinces of Quebec, New Brunswick, and Nova Scotia. In addition to these provinces, an important infestation was also investigated at Winnipeg, Man., in 1917. The species is doubtfully reported from the province of British Columbia, but we have no records of injury therefrom. The insect was doubtless introduced into Canada from the United States where it has long been known as a pest of greenhouse plants.

HABITS AND DESCRIPTION OF THE INSECT

The Egg.—The egg is about one-half millimeter in width, round in outline, much flattened, slightly raised in centre, pearly-white, coarsely reticulated, and from its flattened appearance remarkably like that of the Codling Moth. Before hatching the black heads of the young larvæ are very apparent through the shell. The eggs are laid on the underside of the leaves either singly or several together forming a mass; in the latter case they overlap. Eggs kept under observation at Ottawa hatched in 14 days.

The Larva or Caterpillar.—The larva, when it emerges from the egg,

is in general appearance of a semi-translucent creamy-white colour, the body bearing long, whitish hairs. After feeding it is of a light greenish appearance. The young larvæ feed on the underside of the leaves and eat little holes into the soft tissue. When at rest they curl the head and front segments around to the side of the body and if disturbed, fall and hang suspended on silken threads. The larvæ have five stages, or instars. They do not change very markedly when developing. At full growth they are about three-quarters of an inch in length. The dorsum or back is dark green, the sides and under surface paler. Longitudinal stripes are also present on the back.

We have found larvæ in all stages of development working at the same time and at various seasons. The generations undoubtedly overlap. The caterpillars feed almost entirely on the underside of the leaves, eating away the soft green tissue and spoiling the appearance of the foliage. In the case of the mature larvæ conspicuous portions of the leaves are entirely eaten. The caterpillars are generally found within a slight silken web. In many instances two leaves are brought together and fastened by threads of silk, the larva feeding on the soft tissue on the underside of the upper leaf. The illustration herewith shows the destruction to plants which frequently results from the work of the caterpillars. The bed of ageratum plants in a large greenhouse in eastern Ontario from which the plant in the illustration (b) was obtained was completely destroyed by the larvæ. The figure to the right (a) shows characteristic injury to the foilage of marigold. On the leaf several caterpillars at work may be observed. In the separate illustration a bed of

marigold plants destroyed by the larvæ is shown.

Food Plants.—In Canada, the larvæ have been particularly destructive to cineraria, primula, snap dragon, ageratum, rose, chrysanthemum, mari-

This list of food plants is by no means complete. The caterpillars attack a wide range of greenhouse plants, as in the United States in addition to the plants mentioned above they have infested nodding thistle (*Car-*



A. LEAF OF MARIGOLD SHOWING INJURY BY GREENHOUSE LEAF-TYER; CATERPILLARS AT WORK ON LEAF

B. AGERATUM PLANT DESTROYED BY CATERPILLARS.

gold, geranium, aster, and to a lesser extent to heliotrope, mignonette, sweet pea, fern, salvia, canna, azalea, cyclamen, wall-flower, violet, German ivy, tomato, cabbage and lettuce.

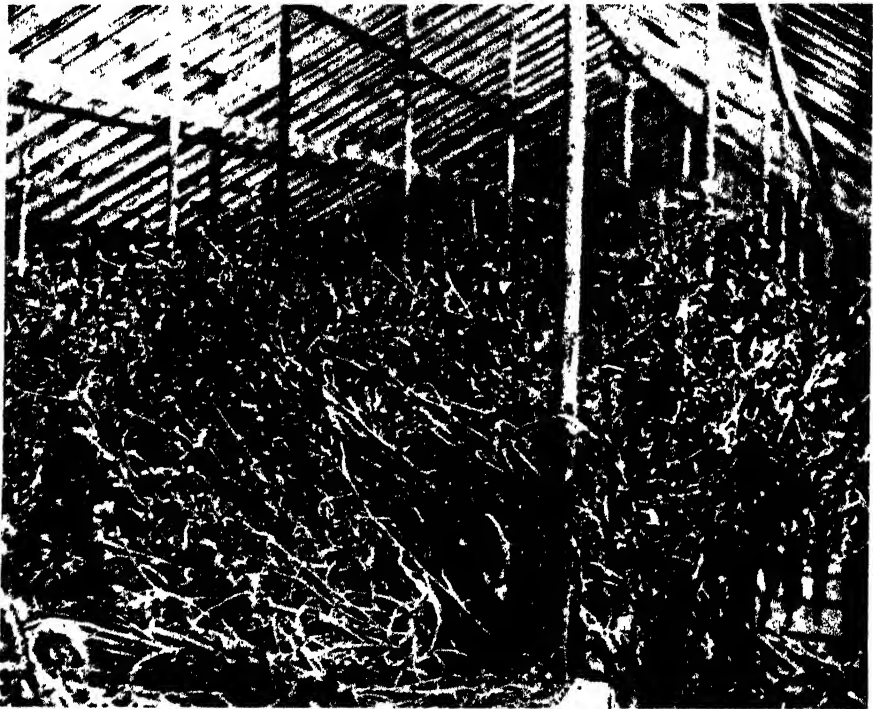
duus), wandering jew, ground ivy, Kenilworth ivy, dahlia, Justicia, Anemone, Matricaria, Passiflora, Plumbago, Ruellia, Tydæa, Lobelia, Veronica, Lantana, Deutzia, clover,

strawberry, parsley, and cucumber. It will, therefore, be seen that almost any soft-leaved greenhouse plant is liable to be attacked.

Under outside conditions, in the United States, this insect has caused injury to celery, for which reason it was designated popularly as the Celery Leaf-tyer, as well also to the leaves of tobacco, cabbage, sugar beet, spinach, nasturtium, begonia, carnation, and a few wild plants.

The cremaster bears eight rust-red bristles, four on each side, which converge and cross at their tips. The length of the pupal stage is from 17 to 20 days.

The Moth.—This is of a rusty-brown colour, the wings being crossed with darker lines. The hind wings are paler than the front wings. When at rest the moth measures three-eighths of an inch at widest part and with the wings spread a



BED OF MARIGOLD PLANTS DESTROYED BY THE GREENHOUSE LEAF-TYER.

When ready to pupate, the caterpillar simply folds over a portion of a leaf and fastens it with threads of fine white silk, or choosing a central portion of a leaf, draws down another leaf to serve as a covering and then changes to a pupa. The cocoon itself is very slight and is merely a web or covering of slender threads of white silk.

The Pupa.—The pupa in length is about three-eighths of an inch and in colour is shining brown, becoming darker with age; it is sparsely hairy.

little over five-eighths of an inch. During the day time the moths have the habit of resting on the underside of leaves or in corners or other sheltered places in the greenhouse. At night they are active, flying about among the plants. From observations made at Ottawa during the winter months from 70 to 75 days, approximately, elapsed from the time the eggs were laid until the resultant moths appeared. Under greenhouse conditions, therefore, there is time from the end of September until the

end of May for at least three or possibly four generations.

Soluble sulphur.... 1 ounce by weight.
Black-leaf 40. 1 fluid ounce.
Water..... 6 gallons.

NATURAL ENEMIES

A small hymenopterous parasite of the leaf-tyer, known as *Apanteles glomeratus* Linn., has been observed in numbers in greenhouses in the United States. A species of *Syne-tæris*, an ichneumonid genus, as well as a tachinid fly, *Phorocera parva* Bigot, have also been reared from the same host in Pennsylvania and Illinois, respectively. We have not as yet reared any parasites from Canadian material.

CONTROL

During the winter of 1918-1919 the Greenhouse Leaf-tyer was freely complained of as a serious pest in many greenhouses in eastern Canada. Conditions were specially investigated in Ottawa, Montreal and Halifax. A survey of the large greenhouses in Montreal indicated that the pest was firmly established and in practically every infestation investigated growers were at a loss to know how to effectively deal with the pest. The old remedies of handpicking, fumigating, etc., had proved to be only partially useful. It was, therefore, decided to conduct control measures in various houses in the above districts.

In discussing the problem of control, by spraying, with Mr. George E. Sanders, in charge of insecticide investigations of the Entomological Branch, he suggested a soluble sulphur-black leaf 40 spray, such a combination having been used by Prof. W. H. Brittain, Provincial Entomologist for Nova Scotia, for certain other insects. The combination which we decided upon is as follows:—

This was tested in large greenhouses in Ottawa, Montreal, and Halifax, and in every case satisfactory results were secured. In the district of Montreal plots of marigold, snapdragon, cineraria, geranium and chrysanthemum, were sprayed by our officer, Mr. J. I. Beaulne, and in every case excellent results were secured. Plots nearby left untreated as checks were seriously damaged. At Halifax, Mr. Joseph Perrin, an inspector of the Entomological Branch, supervised control work in a local greenhouse and the results obtained in this instance were also excellent. In this latter infestation chrysanthemums from two to eight inches high were badly infested. Three applications of the mixture, at intervals of one week, controlled the pest. At Ottawa plots of marigolds were sprayed by Mr. W. P. Shorey, an assistant, with adjoining plots left as checks. In this latter instance the spraying was carried on in early May at a time when the plants were mature, in fact partly down, and when, therefore, it was difficult to apply a spray mixture to reach the caterpillars. Even under such conditions, however, large numbers of the larvæ were destroyed. In controlling an insect which spins as much silk as does the Greenhouse Leaf-tyer, it is important to under spray the plants when they are young and at the first indication of infestation.

In addition to the above combination, other spray combinations were tested in Montreal greenhouses; one of these which gave about as good results is the same as the above with the addition of four ounces of arsenate of lead.

HEALTH OF ANIMALS BRANCH

REGULATION OF HOG SHIPMENTS

FOR the purposes of controlling hog cholera and by virtue of the authority conferred by the provision of the Order-in-Council of November 30th, 1909, containing regulations relating to animal quarantine, a ministerial order was passed on May 26th as follows:

No hogs shall be removed from the public stockyards of the cities of Calgary and Edmonton, Alta., St. Boniface, Man., Moose Jaw, Sask., Toronto, Ont., and Montreal.

Que., except for immediate slaughter, or for export to the United States, unless a permit for their removal has first been obtained from the inspector in charge of the yard. Applicants for permits must state the destination of the hogs they desire to remove and the purpose for which they are intended.

Whenever necessary for the control of hog cholera, permits will be refused unless the hogs for which permit is requested have been immunized by serum administered by a veterinary inspector.

This Order shall become effective June 14th, 1919.

UNITED STATES CATTLE FOR CANADIAN EXHIBITIONS

MINISTERIAL order No. 42 of November 18, 1913, relating to animals' quarantine, has been replaced by the following order dated June 24, 1919, as follows:

"On and after July 2nd, 1919, all cattle over six months old entering Canada from

the United States for exhibition purposes shall be accompanied by a satisfactory tuberculin test chart dated not more than sixty days prior to the date of entry, and signed by a veterinary inspector of the United States Bureau of Animal Industry, and an affidavit or solemn declaration of the owner or importer that the said tuberculin test chart refers to the cattle offered for entry and no other."

THE LIVE STOCK BRANCH

RECORD OF PERFORMANCE TEST FOR PURE-BRED DAIRY CATTLE

BY C. S. WOOD, CHIEF INSPECTOR RECORD OF PERFORMANCE

THERE has been a slight increase both in the number of cows entered for the Record of Performance test and those which have qualified for Certificates, during the year 1918-19, and it is to be expected that when farm help is more plentiful there will be a much larger increase.

The yearly test is conceded to be the most reliable method of obtaining information regarding the production of milk and butter fat, and farmers are availing themselves of this information when purchasing Dairy Cattle.

The following is a summary of the year's work:—

	No. of cows entered for the test.	No. of cows qualified.	No. of cows which produced enough milk and fat to qualify, but failed to calve within fifteen months after commencement of test.
Ayrshire	568	194	43
French-Canadian	36	3	2
Guernsey	23	3	—
Holstein-Friesian	598	175	70
Jersey	245	76	17
Shorthorn	141	45	12
	1,611	496	144

Number of bulls which have qualified for registration since the inception of the test by sireing four or more qualified progeny each from a different dam:—

Shorthorn.....	7
Total.....	151

Following are given the names, records, and owners of the highest



HOLSTEIN COW, "JEMIMA JOHANNA OF RIVERSIDE" 10254, CHAMPION OF THE CANADIAN RECORD OF PERFORMANCE FOR BOTH MILK AND BUTTER FAT



JERSEY COW, "DOROTHY OF AVELREAGH" 6115. FIRST IN THE TWO-YEAR-OLD CLASS, RECORD OF PERFORMANCE

Ayrshire.....	62	butter-fat producing cows in each class for the various breeds since the commencement of the test:—
French-Canadian.....	1	
Holstein-Friesian.....	69	
Jersey.....	12	

Class.	Name.	Reg. No.	Lbs. Milk.	Lbs. Fat.	Owner.
Ayrshire—					
Mature.....	Lady Jane	30886	19,405	786	A. S. Turner & Son, Ryckman's Corners, Ont.
4 yr.....	Milkmaid of Orkney....	39834	14,872	596	Harmon MacPherson, Orkney, Ont.
3 yr.....	Scotch Thistle.....	41685	14,907	631	A. S. Turner & Son, Ryckman's Corners, Ont.
2 yr.....	Springbank White Rose.	44100	12,209	546	A. S. Turner & Son, Ryckman's Corners, Ont.
French Canadian—					
Mature.....	Aromaz.....	1597	13,219	631	Director Experimental Farms, Ottawa.
4 yr.....	Pauline 3rd.....	2482	10,210	484	Pauline Sylvestre, St. Simon, Que.
3 yr.....	Labelle 2nd.....	2865	7,916	406	Director Experimental Farms, Ottawa.
2 yr.....	Bruna Reine....	3228	7,484	337	Paul Sylvestre, St. Simon, Que.
Guernsey—					
Mature	Trislette of Whitewater.	392	15,502	631	Chas. Hawthorne, Chil- liwack, B.C.
4 yr.....	Western Queen	834	12,132	661	Banford Bros., Chilli- wack, B.C.
3 yr.....	Western Queen.....	834	10,153	576	Banford Bros., Chilli- wack, B.C.
2 yr.....	Gladys of Willow ...	654	10,234	544	W. M. Banford, Chilli- wack, B.C.
Holstein—					
Mature.....	Jemima Johanna of Riverside.	10254	30,373	1,024	W. C. Houck, Chip- pawa, Ont.
4 yr.....	Plus Pontiac Artis ..	16792	20,911	816	S. Lemon, Lynden, Ont.
3 yr	Calamity Snow Mech- thilde 2nd....	26707	23,274	843	Walburn Rivers, Fol- den's, near Ingersoll, Ont.
2 yr.....	Duchess Wayne Calam- ity 2nd	15514	16,714	677	Walburn Rivers, Fol- dens', near Ingersoll, Ont.
Jersey—					
Mature	Sunbeam of Edgeley ..	629	18,744	926	James Bagg & Sons, Edgeley, Ont.
4 yr.....	Beauty Maid.....	2019	14,852	872	D. A. Boyle, Wood- stock, Ont.
3 yr.....	Vera Lenore.....	6347	11,136	700	Mrs. A. H. Street, Sardis, B.C.
2 yr	Dorothy of Avelrcagh.....	6115	11,882	666	E. H. Barton, Chilli- wack, B.C.
Shorthorn—					
Mature	Coquette 2nd.....	107052	17,723	636	Ed. Knight, Vanessa, Ont.
4 yr.....	Daisy Lodge.....	109482	11,638	480	Miss Charlotte Smith, Clandeboyce, Ont.
3 yr	Buttercup.....	111906	12,691	482	Geo. W. Carter, Ilder- ton, Ont.
2 yr.....	Springvale Lass 2nd....	120696	10,230	448	John Walker, Nanti- coke, Ont.

PREMIUM POLICY WITH RESPECT TO PURE BRED RAMS

BY NORMAN STANSFIELD, CHIEF, SHEEP AND GOAT DIVISION

THE Honourable, the Minister of Agriculture has authorized the adoption of a new policy for encouraging the use of pure bred rams throughout Canada. It provides for payment of a grant to *bona fide* applicants who comply with the required regulations, of the sum of five dollars annually for two years. Following are the regulations:

1. Any sheep raiser who purchases a pure-bred registered ram of any recognized breed recorded in the Canadian National Live Stock Records or eligible for such registration for use in his own flock and who has not before at any time used a pure-bred registered ram in his own flock shall be entitled to the annual premium of \$5 (five dollars) for two consecutive years, provided the following regulations are complied with:

- (a) He shall swear before a Justice of the Peace or any man commissioned to take oaths to the effect that he has never before used a pure-bred registered ram in his flock and that he has now purchased a pure-bred registered ram which will be used in his flock and state definitely the breed of the ram, from whom purchased and the date of purchase, the private ear-tag number, the registration number together with the number of breeding ewes owned by the applicant.
- (b) If the applicant is a member of any agricultural society it will only be necessary that his application be signed by himself and countersigned by the President of the Society; in such cases the application shall be forwarded by the Secretary of the Agricultural Society to the Sheep and Goat Division, Live Stock Branch, Ottawa. The applicant shall declare that he has never before used a pure-bred registered ram in his flock and that he has now purchased a pure-bred registered ram which will be used in his flock and state definitely the breed of the ram, from whom purchased and the date of purchase, the ear tag number, registration number together with the number of breeding ewes owned by the applicant.
- (c) It will be necessary to forward an application for second annual payment of premium. This application shall be

to the effect that the ram is still alive and is being used in the owner's flock, stating clearly private ear-tag number and registration number. When the applicant is a member of an Agricultural Society his application for second payment of the premium must bear his own signature and be countersigned by the President and Secretary of the Society of which he is a member. In all other cases a sworn statement to the same effect will be required. Should the ram die during the two years and be replaced or have to be replaced for another good valid reason, then the premium will be paid in exactly the same manner.

- (d) Every sheep raiser who receives the premium shall agree to castrate all male progeny of the pure-bred registered ram except that which is from pure-bred registered ewes.
- (e) Application for payment of premium must be forwarded to the Sheep and Goat Division of the Live Stock Branch, Ottawa, not later than the first of December of any year.

2. No individual sheep raiser shall be permitted to receive premiums for more than four rams, that is, a breeder using pure-bred registered rams for the first time shall not receive premiums for more than four rams, even though his flock may be large and require more than four rams.

3. The Live Stock Commissioner reserves the right through his officers to investigate any application and if such application be found irregular to refuse payment of the first or second payment of the premiums.

4. An application from a sheep raiser owning less than 10 (ten) breeding ewes will not be considered.

5. It is expected that the female progeny sired by the pure-bred registered ram will be kept and as many as possible be eventually incorporated into the breeding flock.

6. The number of premiums to be awarded each or any year will be limited. Applications will be considered in the order received at the office of the Sheep and Goat Division, Live Stock Branch, Ottawa, Ont.

RECORD OF PERFORMANCE FOR POULTRY ESTABLISHED

A RECORD of performance for pure bred poultry of standard breeds and varieties is being established by the Dominion Department of Agriculture. Provision is made for establishing foundation stock of certified egg production, which will secure an authentic record upon which breeders and buyers can depend. The need for such a record is based on the room for improvement that exists in the laying capacity of the average flocks and upon the influence exercised by the pure bred flocks in raising the egg-laying standard.

For convenience, and because of the means employed, the record of

performance is divided into two sections, known as A and AA. Record of performance A will be secured by the inspection of trap nested flocks upon the owners' premises, regularly inspected by federal officers. This branch of the work will be in charge of the Poultry Division of the Live Stock Branch. Record of performance AA involves the holding of laying tests and contests at Dominion Experimental Farms and Stations, provincial departments of agriculture, agricultural colleges, and other recognized institutions. This branch of the work is in charge of the Poultry Division of the Experimental Farms.

STANDARDIZATION OF FARM IMPLEMENTS

AT THE conclusion of a session of the Special Committee on Agriculture and Colonization of the House of Commons devoted to the discussion of the subject of the standardization of farm implements, a committee was appointed to meet with a like committee of the manufacturers. The committee appointed consisted of Dr. J. H. Grisdale,

Deputy Minister of Agriculture and the following members of the House of Commons: Messrs. Henders, Harold, Kay, MacNutt, McCoig, Best and Edwards. The committees are expected to meet and go into the whole matter of standardization of farm implements, machinery, etc., and parts thereof before the next session of the House.

"Every School District should be a little democracy, and the school house the social centre of the community, where all the people come together, in a neighbourly way on terms of equality, to discuss among themselves their common interests and to devise methods of helpful co-operation."

PART II

Provincial Departments of Agriculture

THE CO-OPERATIVE MARKETING OF LIVE STOCK

NOVA SCOTIA

BY REV. HUGH MACPHERSON, AGRICULTURAL REPRESENTATIVE, ANTIGONISH

ABOUT three thousand lambs were sold by co-operative associations in the county last season. The stock went to the Halifax or the New England market. The lambs were weighed at county points, a representative of the buyers being generally present. They were

put on board the cars by the associations. Prices were $1\frac{1}{2}$ to 2 cents better than those that would be received from drovers.

Besides the above five hundred and fifty select ewe lambs were sold as breeders.

QUEBEC

BY L. THERRIEN, B.S.A., DEPARTMENT OF AGRICULTURE

THE co-operative sale of live butcher stock has been started in our province and good results have already been obtained.

SHEEP.

Eleven sheep breeders' and wool producers' co-operative associations were organized since 1917. Several of these associations sell sheep co-operatively, and their managing secretaries are agricultural representatives. These associations are operating under the law of the Quebec Co-operative Associations.

Sheep are sold by auction on the county fair ground or in another centre, convenient to the members of the association, or shipped by carloads to the Montreal market. They are graded and sold as follows, at the various loading points:—

Lambs

- No. 1—70 to 100 lbs.
- No. 2—100 lbs. and more.
- No. 3—70 lbs. and less.
- Ram-lambs.

Sheep

- No. 1—100 to 140 lbs.
- No. 2—140 lbs. and more.
- No. 3—100 lbs. and less.
- Rams, all weights.

Each farmer is handed by the manager a weighing and grading certificate for the animals offered for sale. The grading is done in the presence of the farmers. This system has the advantage of encouraging the farmers to castrate at an early date the rams which are kept for slaughter and to better finish their sheep before placing them on the market.

The association charges from 8 to 10 cents for each sheep sold. When shipments are made to the Montreal market, the farmer receives $1\frac{1}{2}$ to 2 cents less per pound, as there must be deducted from the selling price the commission paid to the selling agent, the cost of freight and shrinkage in weight during transportation.

The total value of sheep sold by six of these associations last year, amounts to \$36,544.87.

Through these co-operative sales, farmers have received from 1 to 2 cents more per pound than through local buyers.

LIVE CATTLE AND HOGS.

There is practically no organized system for the sale of cattle and hogs in our province. Live animals are purchased at a fixed price by the great slaughter houses of Montreal and by many rural dealers, and this price is very often below the price that might be obtained on the Montreal market if there were authorized representatives of the farmers on this market. In order to improve matters in this connection, the Quebec Cheesemakers' Agricultural Co-operative Association began last year to sell live stock for its shareholders. This association grades and sells for its members, by carloads only, live animals such as young steers, heifers, bulls, cows, lambs, sheep, hogs and calves. The Association has two kinds of members, individuals, and various sorts of organizations, such as local co-operative associations, farmers' clubs and patrons' associations. The shipments are made from the localities where these associations are operating or from the slaughter houses of St. Valier and Princeville. These slaughter houses are managed by the Quebec Cheesemakers' Co-operative Association. All these animals are weighed and numbered at loading points, and a copy of the weigh sheet with the bill of lading is forwarded by mail to the address of the Cheesemakers' Association.

The marking of the animals makes the work of grading easier. The owner receives the amount due to him as well as a grading certificate, containing valuable information as to the defects noted and the way to correct such defects.

The Cheesemakers' Association has a weekly journal of its own entitled "Le Bulletin des Agriculteurs," which has over 8,000 subscribers. This paper is the organ of the association. Each number contains two pages entitled "Le Marche" giving prices secured and paid to the members during the previous week. It keeps the members informed on the requirements of the market. Several agricultural specialists are among the contributors.

A charge of 2½ per cent is made on the sale of live animals in carloads, in addition to shipment expenses, food given in Montreal and insurance. The shipper is insured against any loss that might occur from an accident during transportation.

During the year 1918, the Cheesemakers' Association received from its members, through the local co-operative associations that are affiliated to it or through the Princeville and St. Valier slaughter houses, about 125 carloads of live animals of all kinds, i.e. 6,900 head. The sale of same produced a total sum of \$152,951.03.

The total turnover of the association for the year ending December 31, 1918, is \$6,001,979.73. All agricultural products handled are graded. The association hopes to be able to apply successfully its system of grading and auction sales and to pay its members according to the quality of the animals that are offered for sale.

ONTARIO

BY F. C. HART, B.S.A., DIRECTOR, CO-OPERATION AND MARKETS BRANCH

LIVE stock shipping co-operatively in Ontario is of recent origin. The oldest association is not more than five years old and it is only within the last two years that the movement has reached any proportions. At the present time, however, there are perhaps 200 to 250 organizations shipping co-operatively, and during the last year about 1,000 cars, valued at approximately \$3,000,000, have been shipped, either direct to abattoirs or over the yards, by farmers' organizations.

Some of these organizations are simply live stock shipping associations organized for this work only. The proportion of these, however, is small; others are regularly organized co-operative businesses which have been in business for some time and have had considerable experience in handling some line or lines of farm produce, or in buying supplies, and have now opened up a live stock marketing department as part of the business. The great bulk of shipping associations, however, have had their origin in farmers' clubs of which there are between 600 and 800 in Ontario. These have started shipping with no further local organization other than that of farmers' clubs. The club appoints a committee, called the live stock committee, to take charge of the shipping and all details are worked out by this committee. This method has given good satisfaction. Where a single club starts by itself there is usually not enough stock to ship regularly and shipments are made only as stock accumulates. This movement is rapidly spreading, however, and clubs are combining their shipments and have regular shipping days. The

most efficient clubs always ship on these days whether full carloads are available or not.

The live stock committee of the club arranges with one of their number or a local drover, conversant with the business, to undertake the actual handling of the stock, paying him either on a commission basis or on straight salary. In many instances a single shipper acts for from two to seven clubs, and shipping from one or more railroad stations. Where such is the case, regular shipping days are established, part carloads are filled up at succeeding stations down the line so that local clubs get the benefit of full carload freight rates, even when the club ships less than a carload. For instance, on Owen Sound to Toronto line, stock is shipped co-operatively from every station from Owen Sound to Orangeville, stock being shipped from ten stations by sixteen farmers' clubs and handled by ten managers. The managers along this line co-operate in filling cars.

Where the stock is shipped by co-operative associations having capital available, it is usual for the association to pay for stock on delivery at the car, and the profits on each shipment are pro rated among the members. Where such method is used the reserve fund is used to meet the losses due to any slight over-payment to members at the time of shipment. When the manager has sold the stock f.o.b., he is able to pay the members on delivery of the stock at the car. Usually however, where the club is selling over the yards, members wait for their returns until the stock is sold. As soon as the returns are received, the manager makes out a statement covering each member's shipment and forwards a cheque. The following is a sample of the member's statement:

SHIPPING STATEMENT

.....LIVE STOCK SHIPPING ASSOCIATION

Shipping Statement

Guelph, Ont., Aug. 16th, 1918.

Name of Shipper—John Smith
Address—Guelph, R.R. No. 4

Shipment No. 4

No.	Class of Stock	Mark	Wt. at Shipping Point.	Selling Wt.	Price	Returns
3	Cattle	1	3060	3030	15c.	\$454.50
					Total.....	\$454.50

	Freight.	\$1.92	
	Selling chgs ..	1.80	
	Feed. ....	.72	
	Yardage.....	75	
	Unloading ...	.12	
	Insurance....	.01	
	Mgr. Comm....	2.40	
	Res. Fund ..	1.13	
	Total.....	\$8.85	\$8.85

Balance due. \$445.65

Enclosed find cheque for this amount.

JOHN WILSON,
Manager.

The charges noted in the above statement called reserve is for the purpose of covering any accidents in shipments while the stock is still in possession of the association. To cover such loss in transit the usual method is to assess each member so much per animal shipped, some clubs charging 15c. per head for cattle and 5 cent per head for hogs and sheep. This has been found ample to cover all losses and create a reserve. The details of handling the business vary of course with the degree of experience among the various managers. It is necessary in this form of shipping that each member's cattle be weighed and sold separately and in order to insure satisfaction each member's cattle are given a different mark, usually a number clipped on the hip. The hogs on the other hand are weighed and graded at the point of shipment as lights, heavies, sows, etc.,

and when sold separately all the selects go together.

The live stock shipping activities in the province have led to farmers of sections purchasing or building their own weigh scales at shipping stations thus giving them greater confidence in the weights as supplied at their local point. A further advantage of live stock shipping has been experienced in Ontario, as in all places where this work has been carried on, in that the quality of stock shipped has been very materially improved.

During the last two or three years the United Farmers' Co-operative Company has been taking consignments of live stock from farmers' clubs over the province and acting through one of the commission firms with a seat on the live stock exchange. Recently however, this co-operative company has purchased its own seat on the exchange and is now taking

shipments direct* and in order to facilitate co-operative shipments by farmers' clubs it is supplying the services of pro rating the returns among the members of the clubs for the local managers. This work is done by the company at its head office and a small additional charge is made.

As intimated previously, the movement towards live stock shipping co-operatively is in its infancy in Ontario. The province however, seems to be on the verge of a great movement in this direction and inquiries regarding this matter come from all parts of the province, and from all indications a radical change in the system of marketing live stock will have taken place in Ontario within the next few years. In order to facilitate this work over the province the Department of Agriculture has had an officer employed whose duty it is to assist such organizations in their shipping, the grading of hogs, keeping of records, etc., etc., the plan being to assist the local organizations to co-operate along railroad lines and systematize the movement of cattle toward the market.

The Department issued a circular giving detailed instructions regarding shipping of live stock, Encourage-

ment is also given towards farmers coming to market with their stock so that they may be better acquainted with the demands of the market and gain, perhaps, a better appreciation of the value of quality of the stock shipped.

BREEDING STOCK

Shipped West

Through the Live Stock Branch of the provincial Department of Agriculture an arrangement is made whereby cars of pure bred stock are shipped from Ontario to Western Canada. A breeder wishing to ship one or more animals notifies the department of his desire and when enough animals have been accumulated to make a car the department arranges for loading the same at a convenient assembling point. The department puts a man in charge of the car and he delivers the animals in the West. Each shipper is charged certain fixed charges for shipping the various classes of animals.

In 1918 there were shipped to Western Canada 21 cars of stock including 67 horses, 250 cattle, 180 sheep, and 4 swine, making a total of 501 animals.

'UNITED FARMERS' COMMISSION DEPARTMENT

ON June 9th a representative of *The Agricultural Gazette* visited the Union Stock Yards and learned that since February 15th of the present year the United Farmers of Ontario have been handling their live stock at the Union Stock Yards, Toronto, through their own Commission Department on that market. The results of the first few months of its operation augur well for the future of this venture. The farmers are well satisfied with the results thus far obtained.

From various rural centres where farmers' clubs are organized the animals are shipped to the Union Stock Yards in car lots. All classes of animals, including cattle, Sheep,

swine, etc., are handled. They are attended by the shipper who is selected from the membership of the local club. This shipper has charge of the assembling, marking, loading, and delivering of the stock, and makes it his business to become thoroughly acquainted with all activities in connection with his office, from the farmyard to the stockyard in the city. In some cases where the full carload is not available at the point of loading it is necessary to complete the load at intermediate points. This is accomplished by systematic arrangements with other "locals" along the railway lines. Thus freight costs are materially reduced.

On arriving at the yards the animals are graded and placed in their respective pens. This work is supervised by the salesman, who thus gets his knowledge of the strong points or weaknesses of the animals he is marketing. He is assisted in this work by the shipper who is attending the cattle. By this method a somewhat more personal interest is taken in the work by the salesman, the shipper, and the farmer.

The Live Stock Commission Department of the United Farmers' Co-operative Company is a recognized factor of the Toronto Stock Yards where the offices are located. The selling is handled in much the same way as that of commission merchants doing business in the same

market. The salesman is thoroughly experienced and competent in handling men as well as animals, and his presence has been kindly received among the Commission men of the market.

Evidence of the success of this new department as well as an idea of the way in which farmers throughout Ontario are utilizing it, may best be gained from the accompanying brief report covering business done during the three and a half months of its career.

Total business handled by the United Farmers' Co-operative Company, Limited, through the Live Stock Commission Department from February 15th to May 31st is as follows:—

—	Cars	Cattle	Hogs	Calves	Sheep	Money Value
						\$ cts
Feb. 15-28 ...	33	460	782		178	78,919 52
Mar. 1-31 ...	159	2,377	4,152		244	404,847 49
April 1-30 ...	250	3,451	6,288	869	271	656,712 31
May 1-31 ...	356	5,750	7,003	1,288	167	1,007,931 89
	798	12,033	18,225	2,157	860	2,148,411.21

The figures in this table show a highly desirable increase with each succeeding month and it is the expectation of those in charge, as well as the farmers supporting the undertaking, that the business is only

beginning. This being the case the outlook for the Live Stock Commission Department of the United Farmers' Co-operative Company is bright indeed.

SASKATCHEWAN.

BY W. W. THOMSON; DIRECTOR, CO-OPERATIVE ORGANIZATIONS

THE first steps towards the co-operative marketing of live stock taken by the Saskatchewan Department of Agriculture was the publishing of a bulletin in 1913 explaining the method of co-operative marketing and the benefits to be obtained thereby. As a result of the publication of that bulletin some nine co-operative stock marketing associations were organized in

the province during 1914. The number has increased until there are now fifty fully registered and incorporated associations doing business, exclusive of the unincorporated locals of the Saskatchewan Grain Growers' Association.

The registered stock marketing associations are incorporated under The Agricultural Associations Act and in most cases carry on several

lines of work such as the handling of fuel, fruit, flour and feed and other farm supplies in addition to the co-operative marketing of live stock for their shareholders. These organizations annually submit a statement to the registrar showing the amount of business of each kind transacted during the preceeding calendar year, and the figures given later in this article are obtained from these reports. No reports are available from the unincorporated locals of the Grain Growers' Association and consequently the figures given are by no means complete.

delivered, the animals are all weighed. Hogs are usually graded according to weight and quality and cattle and sheep are usually branded so that each shipper's animals may be identified when the animals are sold. The producer then receives a receipt specifying the number and kind of animals delivered and shows the grade or brand assigned to his stock. The animals are loaded, shipped to the market and sold through one of the live stock commission firms. The proceeds from the shipment, less freight, yardage, feed and commission charges, are returned to the



LIVE STOCK CO-OPERATIVELY MARKETING BY A SASKATCHEWAN ASSOCIATION

The stock marketing work of these associations is carried on in much the same way. Each association has a manager whose duty it is to look after the details in connection with the marketing of stock and whose remuneration is usually a set rate per hundred on the quantity of the stock marketed or a commission on the proceeds from the sale. Well established associations have set shipping days and each member delivers his stock at the local stock yards. Several associations in the province ship regularly once each week, others every two weeks, while others ship more frequently at one season of the year than others. When stock is

manager. Individual accounts showing the proceeds realized from the sale of each producer's animals and the expenses incurred in handling them, with cheque for the net proceeds is mailed to each shipper. In pro-rating the expenses incurred in the marketing of stock the charges for feed and attendance are divided among the different shippers in proportion to the weight of their animals, while the charges for yardage, weighing, etc., are assessed at the amount charged per head by the stock yard company.

In a business of this kind little or no capital is required. Some new associations find it necessary to obtain

a loan from the local bank to pay advances on stock but as the associations become established this practice is usually discarded.

During the period covered by the report several new associations took

up co-operative live stock marketing and practically all of those who formerly engaged in this work are still carrying it on. The following table summarizes special reports from 11 typical associations.

Name.	No. of cars	No. of shippers	Weight	Saving	Amount saved
Dubuc Grain Growers Association, Limited	6	.....	110,200	$\frac{1}{2}$ c.	\$551 00
Grenfell Grain Growers Association, Limited.....	1	.....	18,380	1c.	183 80
Guernsey Co-operative Association, Limited.....	8	17	148,210	1c.	1,482 10
Lewvan Grain Growers Association, Limited.....	4	38	73,590	$\frac{1}{2}$ c.	551 90
Rocanville Grain Growers Association, Limited.....	10	90	175,740	$1\frac{1}{2}$ c.	2,636 10
Rozilee Co-operative Association, Limited	29	580	559,221	$\frac{1}{2}$ c.	3,495 13
Speers Grain Growers Association, Limited.....	5	42	105,845	$1\frac{1}{2}$ c.	1,587 67
Wauchope Grain Growers Association, Limited.....	2	7	35,440	$\frac{1}{2}$ c.	88 60
Welwyn Grain Growers Association, Limited.....	8	...	136,670	1c.	1,366 70
Wilton Co-operative Trading Association, Limited.....	68	200	1,371,240	$\frac{1}{2}$ c.	6,856 20
Young Grain Growers Association, Limited.....	18	....	197,220	$1\frac{1}{2}$ c.	2,958 30
	159	...	2,931,765	...	21,757 51



UNITED GRAIN GROWERS' LIMITED SELECT A CAR LOAD OF STOCKERS FOR A SASKATCHEWAN FARMER

It will be noticed from the above that a net saving of approximately 73 cents per 100 pounds was realized by marketing co-operatively. This should induce many other organizations to take up stock marketing work.

In this connection we beg to point out that the attention of the Branch has been drawn to the fact that several associations still make a practice of sending a new man down to market each carload, shareholders frequently taking turns in accompany-

ing shipments. This practice, if continued, will seriously interfere with the success of the associations for the reason that in many cases the parties accompanying the stock will look upon the marketing of the animals as only a secondary consideration, their personal business at the marketing centre being to them of greater importance, consequently stock will be neglected in transit and sold to poor advantage. For the greatest success it is necessary that the same party accompany every shipment

for which the railroad companies are not responsible many associations provide a local insurance fund by deducting two or three cents per hundred pounds from the proceeds of all shipments. This amount is placed in a special account from which shippers of stock that is injured or killed, are reimbursed. Other associations prefer to insure their shipment with the local insurance companies but all make some provision for the losses of this kind.

The following table gives the num-



SORTING OUT A CO-OPERATIVE SHIPMENT

so as to become familiar with the markets, and experienced in the business.

To provide against losses in tran-

ber of registered associations marketing stock and the quantity sold for each year since 1914;

Year	Number of associations marketing live stock.	Live Stock.	
		Number of cars.	Value.
1914—9	30	\$ 42,034 22
1915—10	140	150,512 76
1916—23	241	323,171 25
1917—35	548	1,050,285 18
1918—50	750	1,432,000 00

As an indication of the financial benefit derived from the co-operative marketing of live stock it has been ascertained that eleven associations shipping 191 cars of stock in 1917 claimed to have made a saving of \$36,382.25.

It will be noticed that averaging the results obtained by the eleven associations, a net saving of approximately one cent per pound has been realized by marketing co-operatively.

co-operative live stock marketing the Co-operative Organization Branch supplies each new association free of cost with a set of receipt and account forms sufficient to record their marketing for one year together with a bulletin explaining how the accounts should be kept. The Branch is also prepared to send an experienced man to aid the manager of new associations in handling their first consignment. This man will be on hand



A CHOICE LOT FROM A CO-OPERATIVE SHIPMENT

If this amount could be added to the prices realized on all stock marketed from the province, it would mean a very material increase in revenue to our stock men and there is no reason why this co-operative live stock marketing work should not be extended through the establishment of new shipping associations until at least the great bulk of the shipments from the province are handled co-operatively.

To encourage the organization of

to aid him in receiving, weighing, grading and marketing the stock. He will assist him in loading and shipping the stock and will accompany the manager to the central market to aid him in disposing of his stock. It has been found that this assistance encourages many associations to undertake the work and when such benefits have been obtained it is seldom that the associations discontinue stock marketing activities.

WESTERN CANADA

BY E. S. MCRORY, MANAGER, WESTERN DIVISION, UNITED GRAIN GROWERS LTD.

THE progressive spirit which characterizes the Western farmer has led him to invade, year by year, new territory in the commercial world and in no way has he been able to benefit himself to any greater extent than by his endeavours to get what is justly due him in the disposal of his livestock.

FORM OF ORGANIZATION

Here and there, dotted over the prairies from Winnipeg to the Rockies, will be found local organizations called Livestock Shipping Associations which were brought into being by the crying need for a system whereby the small farmer who had only a few head to dispose of would be placed on the same footing as the man who had a carload, as he is enabled by this plan to place his product on the open market where the various buyers bid in competition for it—result, enhanced prices.

THE PLAN

Ordinarily the request for an organizer is received by us from a United Farmers' Association or Grain Growers' local and a date is set for a meeting at which this business is to be discussed. At that meeting the association is formed—having a president, secretary, board of directors, and manager, who may or may not be one of the officers. A shipping day is then arranged and plans are made to send forward their first co-operative shipment. Usually, the organizer returns to that point on shipping day to assist the manager with his duty of seeing that everything is properly recorded—for it must be remembered that this is no ordinary shipment of livestock. First, each man's part of the load must be weighed—then the animals marked so as to make identification a simple matter at the central market, then a record, called the

shipping manifest, prepared so that there is no confusion. All books necessary in order to properly take care of this business are supplied by the central organization, thus insuring uniformity of accounting. The shipment is assembled, loaded, and billed to one of the markets—consigned to the care of the agent of the organized farmers who takes the shipping manifest before mentioned, compares the record with the markings on the animals, and sells them accordingly, after which a statement is prepared showing the amount due each shipper and his division of the expense. This statement, together with the settlement cheque, is then sent forward to the manager of the shipping association, who in turn makes a settlement with the shippers. Usually, the manager accompanies the shipment in order to see that the stock is given proper attention en route. The manager's remuneration may be set at so many cents per hundred weight on the total weight of the shipment, or again it may be set at about 1 per cent of the net out-turns.

INSURANCE

Some associations insure all stock while in transit; others simply assess each shipment a small amount which is placed in the reserve fund to pay losses in case of death or accidents to stock in transit.

During the past year the United Grain Growers, Ltd., handled 4,402 cars of livestock through the medium of their three offices, which are situated at Winnipeg, Calgary, and Edmonton. From the amount of business that it has been possible to do under this plan, it is apparent that the farmers are alive to the situation and are determined to eliminate, in so far as possible, the local buying and selling of livestock. Numerous influences are continually at work trying to disorganize the farmers; in

fact, they go so far in some localities as to offer more for the animals locally than the conditions at the central market warrant—that is, they are prepared to do this for a time at least and, if they can by this method discourage the members of the local shipping association to such an extent that they withdraw their support, they have accomplished what they set out to do and the people themselves are in the long run the sufferers.

A good deal more could be stated in favour of the establishing of co-operative marketing, but suffice it to say that in spite of continual knocks and discouragements the movement, in so far as Western Canada is concerned, is sure to go ahead by leaps and bounds. Less than a decade ago

no individual farmer ever thought of marketing a few head of stock on a central market. Now hundreds, yes thousands, follow this plan consistently year in and year out. In isolated cases they possibly do not secure as much as they are bid locally for their livestock, but these cases are few and far between. Ultimately we expect that no farmer will even consider the question of selling his stock locally and when the various livestock markets of Canada are brought in under government supervision, thus establishing a confidence in the treatment which will be accorded them at the markets, we believe we shall see even greater strides made in this particular form of marketing livestock.

A CONSTANT SUFFICIENCY OF GOOD SEED

The various campaigns to increase production of food crops in Canada during the war have brought out conspicuously the importance of an assured sufficiency of good seed. Professor John Braken of the University of Saskatchewan has proposed a plan which involves the co-operation of the plant breeding stations with the Agricultural Societies. This plan was published in an article entitled "Good Seed" in the April number of the *Agricultural Gazette*. The plan has the approval of a number of officials who are interested in this important subject and who, in the following articles, have expressed their views upon it.

NOVA SCOTIA

THE SCHEME COMMENDED

BY M. CUMMING, PH.D., SECRETARY FOR AGRICULTURE

TO my mind the scheme proposed by Professor John Braken in regard to the supply of good seed has a good deal to recommend it. The most difficult point that would be met with in the administration of this policy would be the actual selection of the men who would grow the improved seed. There might be jealousies involved in this that would create greater difficulty than one would anticipate. There is another difficulty, which is that there are always local conditions in respect to agriculture which cannot be very well foreseen and on account of which it sometimes happens that a very good seed grower might not have as favourable conditions as an adjoining

grower who has been more favoured by weather conditions. The consequence of this will be that some times farmers who are not selected to grow the elite seed will have better seed to offer than those who are so selected. This will not work out to the best interests of the elite seed. If, on the other hand, still greater efforts along educational lines were made to interest parties in growing elite seed of their own, I believe that the ultimate results would be better.

We have been working on this in co-operation with the officials of the Seed Branch of the Federal Department of Agriculture for a good many years and we have made very substantial progress, so much so, in fact,

that seed merchants advise me that they have had to cut down their purchases of seed oats, wheat, etc., to a large extent, farmers having grown their own. There was no compulsion in this scheme and I am of the impression that the results are all the better because it has gradually made headway through its own merits.

Finally, I may state that we have announced that no fields will be admitted to our Field Crops Competition for the year 1920 except those in which the seed is registered. We have not done this until we have

had nearly ten years of preliminary work behind us and the country now seems ready for it and I believe that the purely voluntary work done has in the main proven good and has some merits which a more or less artificial scheme would not have.

Still I hope Professor Bracken's idea will be carried out, for no one can foresee what will happen, and it may prove that under the extra control which may be exerted in connection with his scheme, still better results than those which are outlined in the foregoing will be obtained.

NEW BRUNSWICK

THE PLAN QUITE WORKABLE

BY E. P. BRADT, B.S.A., SECRETARY FOR AGRICULTURE

I HAVE read with a good deal of interest the plan evolved by Professor John Bracken, of Saskatchewan, for keeping up a constant supply of good seed.

It appears to me that the scheme is quite workable and that it should be able to put in effect a sufficient supply

of seed to meet the needs of each district every year. During the past few years there has been so much inconvenience and expense, caused by shortage of seed, that some such scheme could be adopted with decided advantage.

QUEBEC

MACDONALD COLLEGE

IMPORTANT FEATURES EMBODIED IN PROPOSED PLAN

BY R. SUMMERBY, B.S.A., PROFESSOR OF CEREAL HUSBANDRY

PROFESSOR Bracken's plan for the ensuring of a constant sufficiency of suitable seed of cereal crops, to my mind embodies the important features of any plan for successful distribution of seed of high quality. It includes:—

1. A constant source and supply of seed of high quality in quantities.

2. The rapid reproduction of this seed under inspection and control in such a manner as to maintain its purity and without allowing any large quantity of it to be diverted to other purposes than for seed.

3. The co-operation between the plant breeding stations, the agricultural societies and the farmers.

The growing of such a quantity of elite stock seed by the plant breeding station places a great deal of work on that institution and requires more land than is at the disposal of the majority of plant breeding stations. Given a sufficient amount of land and organization for carrying out the scheme there is no reason why it cannot be carried out more efficiently and economically than anywhere else. On the other hand much labour is needed for the proper handling of such a large quantity of elite stock seed, and the immediate need for this might easily overshadow the need for

attention to breeding operations proper. This difficulty must be guarded against.

There should be no unsurmountable difficulty in the way of arranging for the co-operation of the agricultural society and the farmers in producing

further quantities of seed according to Professor Bracken's plan.

Farmers, however, must have assurance of being remunerated for the care and work necessary to produce high grades of seed.

A CONSTANT SUPPLY

BY OSCAR LESSARD, SECRETARY, COUNCIL OF AGRICULTURE

AFTER looking very carefully into the scheme for a constant and sufficient supply of good seed grain, as submitted by Professor John Bracken, I believe that its adoption, if it were possible, would cause an increase in the production of good seed grain. In order to apply same to the province of Quebec it would be necessary that some association supply free of charge a sufficient quantity of grain to sow the proposed twenty acres. Of course this would entail a rather large expenditure. There are agricultural associations in our province but they are not allowed by their regulations to spend any part of their revenue on the purchase of grain, seeds or chemical fertilizers. These regulations might be amended to enable some of these associations to follow

Professor Bracken's suggestion and purchase seed grain out of their regular revenues, but we believe that such amendment would not be desirable as it would delay and even injure the fulfilment of the programme that these associations have set out to accomplish.

Professor Bracken speaks of an association called "Selection Stations". There is no association of this kind in the province of Quebec. There has been in this province a new scheme adopted to encourage the production of seed grain. This is a competition in threshed grain that will be examined in the barns of the competitors, who must have a large number of bushels in order to be eligible for entry. Valuable results are expected from this contest.

ONTARIO

A MOVEMENT IN THE RIGHT DIRECTION

BY J. LOCKIE WILSON, SUPERINTENDENT OF AGRICULTURAL SOCIETIES

THE proposition made by Prof. Bracken of Saskatchewan University, would seem to be a movement in the right direction for the production of better seed for the field crops of Canada. The agricultural societies of Ontario have for the past twelve years been making rapid strides in this regard through their standing field crop competitions. The best farmers of this province have entered enthusiastically into this work and each year shows marked progress in the production of high-class seed grain. Annually the agri-

cultural societies branch publish a full report of the work done in this connection. It contains the name of the agricultural society, the names and addresses of the competitors, and the variety of grains sown, together with their score and standing in the crop competition and the prizes taken at the Canadian National and Central Canada Exhibitions, and Guelph and Ottawa Winter Fairs. The grain at these Exhibitions is sold by public auction and top prices are realized. In 1919, 7,500 farmers took part in the competitions and this plan for

the production of good seed meets with the approval of all concerned. However, I am of opinion that additional good work will be accomplished by adopting Prof. Bracken's plan in co-operation with our 350 agricultural societies. I would suggest for Ontario, however, that 10 acres be the size of the field in which the grain is to be grown. This will ensure greater care being taken of the field. Prof. Bracken speaks of the grain

being officially inspected during the first year. In order to ensure continuous good results I would suggest that it be officially inspected the second year also. The matter will be taken up by me at the next annual convention of the Ontario Association of Fairs and Exhibitions next February, which is attended by delegates from all the agricultural societies in the province.

ALBERTA

A SCHEME IN GENERAL SOUND

BY H. A. CRAIG, B.S.A., DEPUTY MINISTER OF AGRICULTURE

MY OPINION is that the scheme suggested by Professor Bracken for growing seed grain in general is sound, though its success will depend upon the men who carry out the details. There is no question that good seed is scarce at the present time, as well as difficult to locate. I believe that it is the

function of the government to organize a system whereby a supply of good seed may be obtained with ease by the farmers and I think the scheme as outlined by Professor Bracken may be productive of good results to the farmers of any province that adopts it.

BRITISH COLUMBIA

AN EXCELLENT PLAN

BY P. A. BOVING, ASSISTANT PROFESSOR OF AGRONOMY, COLLEGE OF AGRICULTURE

THE plan submitted, whereby the regular and far too often occurring seed shortage may be reduced, is a very excellent one, and Professor Bracken deserves a great deal of credit for his proposal.

Something similar has been practised in different European countries, particularly among producers of root and vegetable seeds. One or two outstanding men, with special interest for seed growing and selection, are delegated to grow what is known as "stock seed", which would correspond to the twenty acres first year crop in the plan under discussion. The other seed growers of the community or district receive the stock seed for the production of ordinary commercial seed.

If the growers are guaranteed a fair price over and above the market average of, say, November, December, January, and February there is every reason to believe that a constant supply of good seed may be ensured. One improvement on prevailing conditions which might accrue from co-operative seed growing is that a guarantee might be given for variety, purity, and for the percentage of germination.

It would thus be possible to distribute good and reliable seed at reasonable prices throughout the country. This would do more towards introducing suitable varieties in various districts than many volumes of writing and any number of cubic yards of talking. The majority of our farmers

realize that good seed is a desirable thing, but they hesitate, and not without reason, to pay double, treble

and quadruple prices, or more, for a commodity in regard to which they have no assurance.

CANADIAN SEED GROWERS' ASSOCIATION

BY L. H. NEWMAN, SECRETARY

THE plan suggested by Professor Bracken of the Saskatchewan Agricultural College for providing against a shortage of good seed, published in the April number of The Agricultural Gazette, should go a long way towards solving the seed situation during the average year providing it could be worked out satisfactorily. If the country generally could be induced to under-

take a scheme of this sort, the danger of a serious shortage would be greatly obviated. I am afraid however that the plan would be hard to carry out fully. Moreover not all districts are well suited to the production of seed. The scheme is a step in the right direction, and our Association would co-operate in every possible way in its execution.

GRADUATES OF AGRICULTURAL AND VETERINARY COLLEGES

NOVA SCOTIA AGRICULTURAL COLLEGE

FOLLOWING is a list of the students who received diplomas from the Nova Scotia Agricultural College this year:

Harold V. Colpitts, Lewisville, N.B.
Philip Bishop, Greenwich, N.S.
Fred Johnson, Greenwich, N.S.
Walter Wright, Central Bedeque, P.E.I.
J. Louis Stoddart, Stoddartville, N.S.

Robt. Bishop, Greenwich, N.S.
Wm. T. Perry, Butternut Ridge, N.B.
Alexander Palmer, Berwick, N.S.
Douglas Archibald, Newton, N.S.
Fred Wasson, Young's Cove Road, N.B.
Donald Rogers, Hopewell Hill, N.B.
Alvah MacEwen, St. Peters Bay, P.E.I.
Antoine Leger, Richibucto Village, N.B.
Sylvio Martin, Caron Brook, N.B.
S. W. B. Muir, Shelburne, N.S.
John B. Irvin, Point de Bute, N.B.
Earle Weir, Centre Rawdon, N.S.

SCHOOL OF AGRICULTURE, STE. ANNE DE LA POCATIERE

Seventeen students passed the examination at the agricultural school at Ste-Anne-de-la-Pocatiere which entitled them to have conferred upon them by the University of Laval the degree of Bachelor of Scientific Agriculture. The first four in the following list of graduates won distinction:

LIST OF GRADUATES

Adelard Godbout, Antoine Langlais, Francois-Xavier Robitaille, Auguste Pepin, Charles Gagne, Raoul Dionne, Maximilien Lemieux, Louis-Philippe Dionne, Maurille Faucher, Bruno Botvin, Alphonse Laflamme, Louis Pelletier, Ulric Brown, Epiphane Theriault, Gaspard Boucher, Florian Champagne, Georges Michaud.

MACDONALD AGRICULTURAL COLLEGE

The degree of B.S.A. was conferred on Eric Grove White, Kilbryne Doneraile, County of Cork, Ireland, and Charles John Wilcox, R. R. 3, Magog, P.Q. These men took their work for the degree in the school

of agriculture prior to serving overseas. Both men had seen considerable military service, Mr. Wilcox receiving his commission on the field and winning the military medal and military cross.

SCHOOL OF HOUSEHOLD SCIENCE

At the Macdonald school of Household Science fifteen students graduated in institution administration and twenty in the homemakers' course. Following are lists of the graduates in these courses:

GRADUATES IN INSTITUTION ADMINISTRATION COURSE

Mary L. Brumell, Buckingham, Que.
 Marguerite B. Magee, Merrickville, Ont.
 Marjorie L. Cochrane, Lennoxville, Que.
 Jean O. Anderson, Buckingham, Que.
 Jeanette Orr, Kensington, P.E.I.
 Margaret R. Taylor, Kingston, Ont.
 Florence C. Martin, Grand View, P.E.I.
 M. Charlotte Magee, Merrickville, Ont.
 E. Mabel Boulden, Ste. Anne de Bellevue, Que.
 Marjorie Ross, Westmount, Que.
 Frances Thomson, Westmount, Que.
 Bessie L. Carruthers, Charlottetown, P.E.I.
 Susie M. Crane, St. Johns, Nfld.

Mary C. Mowat, Pictou, N.S.
 Helen W. Wetmore, Clifton, N.B.

GRADUATES IN THE HOMEMAKER COURSE

Grace H. McOuat, Lachute, Que.
 Helen E. Flaherty, Waltham, Mass.
 Frances M. Clarke, Mont Tremblant, Que.
 Bonnie E. Cookson, Montreal, Que.
 Helen O. F. Van Wart, Fredericton, N.B.
 Phyllis C. Abbott, Senneville, Que.
 Doris E. Anderson, Montreal, Que.
 Zoe D. Munro, Pictou, N.S.
 Jean Crawford, St. Johns, Nfld.
 Faith Mathewson, Montreal, Que.
 Vera G. Eakin, Westmount, Que.
 Florence L. Henderson, Westmount, Que.
 Elsie I. Gilchrist, Westmount, Que.
 Kathleen G. Gibson, Fredericton, N.B.
 Jean Coltart, Westmount, Que.
 Riva Leavitt, Montreal, Que.
 Margaret D. Graham, Montreal, Que.
 Sadie Freedman, Westmount, Que.
 Jean T. Tubman, Ottawa, Ont.
 Diana V. Campbell, Winnipeg, Man.

OKA AGRICULTURAL INSTITUTE, LA TRAPPE

The diploma of Bachelor of Agriculture was awarded this year, to the following pupils of the Institute:

Name	Address
Napoleon Beaudoin	St. Luc, comte de Champlain.
Florentin Beliveau	B.A., St. Gregoire, Nicolet.
Roland Brassard	Roberval, Lac St. Jean
Nelson Cossette	Champlain.
Chs. A. Courchesne	B.A., St. Ambroise de Kildare, Joliette.
Amedee Filion	B.A., Ste. Therese, Terrebonne.
J. Aime Gagnon	B.A., Laprairie, R.R. 2 Laprairie.

Emile Gauthier, B.A., St. Theodore d'Acton, St. Hyacinthe.
 Georges Gelinass, St. Boniface de Shawinigan.
 Henri Heon, B.A., St. Louis de France, Champlain.
 Alphonse Lafrance, Oka, Deux-Montagnes
 Ferdinand Larose, B.A., Buckingham.
 Hector Leblanc, B.A., Tingwick, Arthabaska.
 Georges E. Mayrand, St. Casimir, Portneuf.
 Henri Plourde, B.A., Metabetchouan, Lac St. Jean.
 Gustave Toupin, B.A., St. Isidore, Laprairie.

ONTARIO AGRICULTURAL COLLEGE

Twenty-five candidates wrote on the final fourth year examinations at the Ontario Agricultural College and twenty-three of them secured their B.S.A. degree conferred by Toronto University. Two candidates have

each to take supplementary examinations. Seven of the graduates have returned to their home farms and a number of others have received appointments.

Following is a list of the graduates:

Name	Address	Occupation
Allan, R. D.	Ottawa, Ont.	Manager, Co-operative Association, Petrolea, Ont.
Aylsworth, D. F.	Bath, Ont.	Farming at home.
Begg, R. E.	Tiverton, Ont.	Soldiers' Settlement Board, Toronto.
Brink, R. A.	Woodstock, Ont.	Fellow in Chemistry, O.A.C., Guelph.
Caldwell, W. C.	Carp, Ont.	Soldiers' Settlement Board, Toronto.
Edgar, J. D.	Guelph, Ont.	With Trinidad Government.
Grant, G. S.	Port of Spain, Trinidad	"Nor'-West Farmer" Winnipeg.
Gunn, W. R.	Avonmore, Ont.	
Henry, C. H.	Truro, N.S.	
Hessel, E. C.	Vernon, B.C.	
Higgins, J. R.	Kemptville, Ont.	Farming at home.
Huckett, H. C.	Torquay, S. Devon, Eng.	Entomological Dept., O.A.C., Guelph, Ont.
Hunter, F. G.	Toronto, Ont.	
Jones, T. H.	Fruitland, Ont.	Farming at home.
Lamont, C.	Mount Brydges, Ont.	Farming at home.
Luckham, C. F.	Burnam, Ont.	Farm Survey Dept., O.A.C., Guelph.
Matheson, D. J.	Lucknow, Ont.	Farming at home.
Munro, J. B.	Slate River Valley, Ont.	Assistant Editor, Publication Branch, Department of Agriculture, Ottawa.
McCall, G. W.	Fort William, Ont.	Soldiers' Settlement Board, Toronto, Ont.
MacKenzie, C. F.	Guelph, Ont.	Associate Editor, Farmers' Magazine, Toronto.
Shales, J. M.	Perth Road, Ont.	Agricultural Instruction, Langely, B.C.
Stillwell, E. C.	Elgin, Ont.	Swift Canadian Company, Toronto.
Tice, C.	Guelph, Ont.	Field Husbandry Dept., O.A.C., Guelph.

MACDONALD INSTITUTE, GUELPH

The Domestic Science graduates of Macdonald Institute, Guelph, are:--

NORMAL COURSE

Lillian Beaman, Essex, Ont.; Jessie DeGuerre, Mt. Albert, Ont.; Jean Flatt, Tantallon, Sask.; Evelyn Maclean, Winnipeg, Man.; Ida Mogg, Galt, Ont.; Winnifred Suttaby, Gravenhurst, Ont.

ASSOCIATE COURSE

Mary Graesser, Guelph, Ont.; Frances Hilliard, Guelph, Ont.; Carita McKiel,

Guelph, Ont.; Grace Totten, South Woodlee, Ont.

HOUSEKEEPER COURSE

Muriel Brown, Watford, Ont.; Mary Eustis, New York, N.Y.; Jessie Germian, St. George, Ont.; Marjorie Harley, Guelph, Ont.; Kathleen Lethbridge, Fingal, Ont.; Ethel Nichol, Beeton, Ont.; Lena Reid, Wallaceburg, Ont.; Mrs. M. Barbara Smith, Prince Albert, Sask.; Mary Wismer, Blair, Ont.

MANITOBA AGRICULTURAL COLLEGE

This year six students graduated in Agriculture and received the degree of B.S.A. and four graduated in Home Economics and received the degree of B.H.Ec. The graduates in Agriculture were:—

J. A. Cox, St. Agathe, Man.
E. S. Hayter, Grandview, Man.
R. E. Heise, Isabella, Man.
A. McWilliam, Rossendale, Man.
J. H. Tolton, Oak Lake, Man.
A. K. Stratton, Stonewall, Man.

The graduates in Home Economics were:

Miss Ethel Armstrong, Brandon, Man.
Miss Gladys Henry, Killarney, Man.
Miss E. Moore, Manitou, Man.

Miss Margaret Speechly, Winnipeg, Man.

The Lieutenant Governor's gold medal for highest general proficiency in the graduating year in Agriculture was won by Mr. J. H. Tolton, Oak Lake, Man. The T. Eaton Co's silver tea service for highest standing in Home Economics was won by Miss Margaret Speechly of Winnipeg.

Messrs. Cox, Heise, Tolton and McWilliam have returned to their farms. Mr. Stratton has taken a position in the Poultry Department of the Manitoba Agricultural College and Mr. Hayter is in the Field Husbandry Department of the College.

UNIVERSITY OF SASKATCHEWAN COLLEGE OF AGRICULTURE

The graduates this year in the B.S.A. course are Geoffrey Bodman, Dilke, Sask.; John F. Booth, Semans, Sask.; W. E. Lake, Edam, Sask.; W. A. Thomson, Pense, Sask.

Mr. Bodman won the Walter Scott Scholarship in Agriculture for the best student graduating and also the Governor-General's gold medal in competition with students in all of the other faculties. Mr. Bod-

man is this summer assisting in Soil Physics. Messrs. Booth and Lake are District Representatives for the Department of Agriculture in the Weeds Branch. Mr. Lake expects to go, in the fall, to South Dakota to take up post graduate work with Professor Hansen. Mr. Thomson has gone to his farm at Pense.

UNIVERSITY OF ALBERTA COLLEGE OF AGRICULTURE

Five students passed the final examination in the College of Agriculture securing the B.S.A. degree. These are W. M. Fleming, G. L. Flack, N. F. Bell, T. H. Hagerman and C. T. Tapp. The two first named have been appointed on the staff of the University. Mr. Fleming

is attached to the Field Husbandry Department and Mr. Flack to the Animal Husbandry Department. Mr. Bell has been appointed Manager of a farm that is devoted largely to the raising of Aberdeen Angus cattle. Messrs. Hagerman and Tapp have returned to their own farms.

MONTREAL SCHOOL OF COMPARATIVE MEDICINE AND VETERINARY SCIENCE

The final examinations of the Montreal School of comparative Medicine and Veterinary Science were held on the 12th, 13th, 14th and 15th of May. Out of a class of sixteen, eight candidates secured diplomas and eight the doctor's

degree conferred by Laval University. The following received the doctor's degree:

T. J. A. Bigras,	J. B. A. Lefebvre,
J. W. H. Fradette,	C. J. Poirier,
L. P. Jasmin,	G. Helce,
J. S. Jasmin,	J. E. Tetreault.

ONTARIO VETERINARY COLLEGE

The graduating class at the Ontario Veterinary College this year included thirty-nine men, ten of whom were former students who were returned from active service overseas by order of the military authorities to continue their professional training.

The first prize for general proficiency was awarded to R. Gwatkin, second prize awarded to S. W. Carter, and the third prize to E. B. Beals.

A scholarship of \$75 was awarded by the College to H. W. Nurse for the best report of a case read and defended before the Science Association of the Ontario Veterinary College.

Following is a list of the members of the class:

Andries, A. J., Deloraine, Man.
Armstrong, G. P., Rossburn, Man.
Armstrong, J. H. O., Ottawa, Ont.
Beals, E. B., Greene, Maine.
Bescoby, F. H., Toronto, Ont.
Brazenall, F., Prince Albert, Sask.
Carter, S. W., Jacksonville, Ill.
Chase, S. H., Consecon, Ont.

Davis, H. J., Woodstock, Ont.
Fisher, J. R., Brandon, Man.
Gibson, H. H., Newport, N.S.
Gwatkin, R., Strassburg, Sask.
Herman, L. L., Williamsville, N.Y.
Houston, J. E., Milestone, Sask.
Humphreys, F. A., Ardath, Sask.
Johnson, J. E., Thedford, Ont.
Kelleher, W. J., Guelph, Ont.
Laughlin, W. M., Chardon, Ohio.
Learmonth, R., Troy Center, Wis.
Lindsay, W., Rosseau, Ont.
McAlphine, L. C., Toronto, Ont.
McConnell, J. C., Hamiota, Man.
McKercher, D. A., Williamson, Sask.
Marsden, H. W., Excel, Alta.
Martinaglia, G., Randfontein, S. Africa.
Miller, G. B., Portage la Prairie, Man.
Miller, M. H., Killarney, Man.
Nicholls, W. E., Hamilton, Ont.
Noble, I. B., Tompkins, Sask.
Nurse, H. W., Wallenstein, Ont.
O'Neill, J. J., Sans Bruit, Que.
Richardson, C. H., Toronto, Ont.
Rivington, R. H., Almonte, Ont.
Smith, J. W., Maxim, Sask.
Stevens, H. C., Sonya, Ont.
Thomas, E. B., Box Grove, Ont.
Ungar, E. B., Napanee, Ont.
Watson, W., Howick, Que.
Webster, F. H., Welwyn, Sask.

NOVA SCOTIA

AGRICULTURAL LEGISLATION

BY DR. M. CUMMING, SECRETARY FOR AGRICULTURE

ONLY one specifically agricultural Act was passed during the year. This was an *Act for the Encouragement of the Improvement of Live Stock*. This Act makes provisions under which a penalty may be imposed upon anyone owning or harbouring a scrub bull and offering the same for public service within an Agricultural Society District.

In the general amendments to the statutes provision is made for defining Agricultural Society Districts which, briefly, may be done at any meeting of the agricultural society regularly called, at which a by-law, to be subsequently approved by the Governor-in-Council, may be passed in respect to these boundaries.

The major increase in the appropriations in the Nova Scotia legislature for the current year was on

account of the road policy which, after all, is a real contribution to the development of agriculture.

In respect to agriculture proper no substantial changes have been made, the appropriation on account of current expenditure chargeable to revenue being \$92,250 in comparison with \$90,000 the previous year. This amount will be supplemented by about \$10,000 payable by orders-in-council under the provisions of special acts for the assistance of dairying, wheat raising, etc. The increase for the current year was practically all on account of the College Farm, to meet the increased cost of wages and feed, and will be fully offset by the estimated revenue.

In detail the following are the appropriations:—

	1918	1919
	\$ cts.	\$ cts.
College and Farm	37,000 00	39,000 00
General Agriculture	38,000 00	
Salaries and Expenses of Officials		18,000 00
Grant to Agricultural Societies		15,000 00
Grants for County Exhibitions		7,500 00
Entomological Department		3,500 00
Farmers and County Associations		1,450 00
Field Crops Competitions		1,000 00
Assistance to Dairying		2,000 00
Model Orchards		1,000 00
Assistance to Poultry		800 00
Stallion Enrolment		600 00
Printing and Advertising		1,400 00
Miscellaneous		1,000 00
Agricultural Societies	15,000 00	
	90,000 00	92,250 00

On capital account there is an appropriation of \$2,500 for an addition to the poultry plant to accomo-

date an egg laying contest during the next winter and summer.

NEW BRUNSWICK

DIRECTOR OF ELEMENTARY AGRICULTURAL EDUCATION APPOINTED

BY E. P. BRADT, B.S.A., SECRETARY FOR AGRICULTURE

MR. A. C. Gorham, B.S.A., M.Sc., has arrived in the Province and taken up his duties as Director of Elementary Agricultural Education. Mr. Gorham succeeds Mr. R. P. Steeves, who has very capably carried on the work of this Division of the Department of Agriculture for the past five years, but who has found it necessary to retire because of poor health.

Mr. Gorham's qualifications are such as to specially fit him for the work of his Division. He was born in St. John County, was educated at the Public and High Schools of St. John. He received his Normal training at Fredricton and successfully taught in the public schools of the province for three years, paying particular attention to agricultural work. In order to specialize in this work, he enrolled as a student

at the Macdonald Agricultural College, in Quebec, and received the degree of B.S.A. from that Institution in 1913. After graduation he accepted the position of Assistant Horticulturist on the staff of the Macdonald College, which position he filled until 1918.

During the past year he has been taking post graduate work at Cornell University, Ithaca, N.Y., and has just been awarded the degree of Master of the Science of Agriculture from that University.

Mr. Gorham's first work in the province will be in organizing and conducting the Rural Summer Science Course for Teachers, which will be held at Sussex from July 8th to August 5th. His Special training will give him a good grip of the needs of this school and a very successful course is assured.

TEN-DAYS COURSE IN HOUSEHOLD SCIENCE

BY HAZEL MCCAIN, SUPERVISOR

THE purpose of the ten-days course is to place within easy reach of every woman and girl in New Brunswick, the advantages and benefits to be derived from a short course training in household science. To do this the New Brunswick Department of Agriculture has engaged specialists to give practical instruction in those matters tending towards a high standard of efficiency in home and community life.

Owing to conditions resulting from the influenza epidemic, the short courses in household science, held under the auspices of the New Brunswick Women's Institutes, were not opened until Feb. 18, 1919. These

courses last for ten days and this year were held in eight different centres throughout the Province, viz; Woodstock, Edmundston, Fredericton, Newcastle, Bathurst, Sussex, St. Stephen and St. John. Classes in cookery, sewing, millinery and nursing were held each day throughout the course. Efficient instructors, specialists in their respective subjects, conducted the classes. Intense interest in the work was shown everywhere throughout the province and a general feeling prevails that much good has been done.

During the last week of March and the first week of April we had the opportunity of co-operating with the Agricultural Societies in their short

course work held in Madawaska and Victoria Counties. One session of each of three short courses held in three counties was given over to the Women's Institute for demonstration and instruction purposes.

Proud are we with the successful results of our co-operative action. Following these short courses an organization campaign was launched in the counties of Madawaska, Restigouche, Gloucester and Kent, resulting in the addition to our organization of seventeen new branch institutes. These branches were established in the French speaking districts, the work being conducted by the French Assistant to the Supervisor of Women's Institutes in New Brunswick.

One short course lasting three days was given to the French speaking members of the institutes of

Madawaska county at Clairs. Classes in cookery, house management and home nursing were held each day of the course. Similar courses are being held in June and July in the counties of Restigouche, Gloucester and Kent.

The summer campaign of 1919 will take the form of demonstration work among all the branch institutes the contemplated subject being milk, its composition, food value and practical uses.

According to the branch reports sent in to head office each month, the prevailing work seems to be community, school improvement and public improvement work. Some work also is being done in connection with the War Savings and Thrift Stamp campaign—The work of the War Savings Society being incorporated into that of the branch institute.

DAIRY HERD COMPETITION

BY H. W. COLEMAN, DAIRY SUPERINTENDENT

FOR the purpose of stimulating the interest in dairying and encouraging increased production, the New Brunswick Department of Agriculture has organized a Dairy Herd Competition. Following are the rules and regulations:

RULES AND REGULATIONS

1. The competition is open to patrons of such cheese factories and creameries in the province as have on or before the 1st of June become members of the New Brunswick Dairymen United, by the payment to the secretary of that organization the annual membership fee of 50c. per patron for cheese factories and 25c. per patron for creameries.

2. Each factory or creamery committee shall determine the least number of cows which shall constitute a herd in their own factory or creamery.

3. The competition shall begin on June and, 1919, and shall cover a period not less than four months and shall close not later than October 31st, 1919.

The figures which determine the standing of herds must be taken from the factory or creamery books and a statement showing the total number of cows, total pounds milk or fat produced by each of the herds showing the highest average production per cow, must be certified to by the owner of the herds, the cheese or butter maker, and the secretary of the factory or creamery. This statement must be in the hands of the secretary of the New Brunswick Dairymen United on or before the 20th of November, 1919.

5. The average amount of milk or butter fat per cow must be determined on the basis of the total number of cows from which milk or fat has been sent to the factory or creamery during the competition period.

6. In cheese factories the average pounds of milk per cow shall be the basis upon which the standing shall be determined. In creameries the average pounds of butter fat shall be the basis.

7. No substitution of one cow for another will be allowed.

8. The prize money shall be distributed at the next annual meeting of the New Brunswick Dairymen United.

QUEBEC

STABLE CONTESTS

STABLE contests are being organized in the province of Quebec with the object of encouraging farmers to improve their stables as regards hygiene, time and money saving, and the conservation of solid and liquid manures. Following are the rules governing the contest, and also the score card, as stated in Circular No. 22 of the Department of Agriculture for the province of Quebec;

RULES GOVERNING THE CONTEST

- 1.—At least 10 competitors are required to organize a stable contest.
- 2.—This contest must be organized by a farmers' club under the supervision of the Agricultural Representative.
- 3.—One contest only will be subsidized by the Department of Agriculture, each year, in a county where there is a representative.
- 4.—Clubs having organized a contest, one year, will not be entitled to a new grant,

another year, for the organization of another contest.

5.—The Agricultural representative shall visit the competitors' stables during the winter and make the necessary suggestions for the improvement of each one. In the fall, when the animals have been taken in, he shall make another visit, accompanied by a judge appointed by the Department of Agriculture, who will judge the stable as per the official score card, given hereafter, keeping an account of the improvements made by the competitor during the summer.

6.—Competitors obtaining less than 50% of the score will not be entitled to any prize.

7.—The minimum number of prizes offered is 5. If there are more than 17 entries to the contest, the number of prizes will be equal to one-third of the number of competitors, up to the maximum of 10 prizes.

8.—Each contest will receive, from the Department of Agriculture, a grant proportional to the number of competitors, or \$3.00 for each competitor entering the contest.

9.—The minimum of the grant will be \$30.00 and the maximum \$100.00.

10.—The amount paid for each prize awarded is shown in the following table:—

Number of competitors	Number of prizes awarded	1st Prize	2nd Prize	3rd Prize	4th Prize	5th Prize	6th Prize	7th Prize	8th Prize	9th Prize	10th Prize	Total
10	5	\$ 8.00	\$ 7.00	\$ 6.00	\$ 5.00	\$ 4.00						\$30.00
18	6	11.50	10.50	9.50	8.50	7.50	6.50					54.00
21	7	12.00	11.00	10.00	9.00	8.00	7.00	6.00				63.00
24	8	12.50	11.50	10.50	9.50	8.50	7.50	6.50	5.50			72.00
27	9	13.00	12.00	11.00	10.00	9.00	8.00	7.00	6.00	5.00		81.00
30	10	13.50	12.50	11.50	10.50	9.50	8.50	7.50	6.50	5.50	4.50	90.00

11.—The surplus of the grant awarded for any number of competitors between 10 and 17, between 18 and 20, between 21 and 23, between 24 and 26, between 27 and 29, between 30 and over, will be equally divided among the prizes awarded for the contest.

12.—The prizes won by competitors in a contest will be distributed by the Agricultural representative at a meeting of the Farmers' club. Besides, at this meeting, the Agricultural representative shall explain the result achieved by each competitor and give appropriate advices.

SCORE CARD FOR THE CONTEST

- 1.—Aspect and location..... *Maximum* 5
- 2.—Area and cube air per animal..... 15

- 3.—Ventilation..... 15
- 4.—Lighting..... 10
- 5.—Floor space facilities... 25
 - (a) for cleanliness
 - (b) for retaining liquid manure.
- 6.—Distribution and quality of water..... 10
- 7.—Arrangement: (mangers, ties, etc., milk room)..... 10
- 8.—Conveniences..... 5
- 9.—Appearance (whitewash and cleanliness)..... 5
- Total.. .. 100

ONTARIO

SCRUB BULL CAMPAIGN

BY C. F. BAILEY, B.S.A., AGRICULTURAL COMMISSIONER

FOR some months past the Ontario Department of Agriculture has been giving considerable attention to the study of live stock improvement in Ontario. In this connection the agricultural representatives of the Department were instructed to make a survey of the number of scrub bulls used in their respective counties and have confirmed our former opinions as regards the use of grade or scrub bulls. While some counties are almost free from the use of scrub bulls a great many of them range anywhere from 15 to 30 per cent and in quite a number of cases the percentage runs as high as 75 per cent or 80 per cent.

In view of the conditions as above stated the Department has decided to make a special effort to interest the owners of grade sires in the breeding of better stock and assist them in securing bulls of good breeding and quality at reasonable prices. The first step in connection with this campaign will be to have the agricultural representatives make a complete census of all the bulls in their respective counties in order that we may have accurate information of the bulls used together with their breeding, etc. They will also be instructed to make a census of all the pure bred breeders of live stock similar to the one conducted in 1914. Lists will include the names of all the breeders of pure bred stock together with the number of breeding animals and the name of the sire used. We feel that it is very important to have the name of the sire as it is usually a fair indication of the class of stock the farmers breed. The publicity in connection with this campaign will be in the hands of Professor Wade Toole of the Ontario Agricultural College.

R. W. Wade, Director of the Live Stock Branch of the Department will have charge of the purchase and distribution of bulls. The agricultural representatives are to organize pure bred bull clubs and through this organization an effort will be made to interest the members of the clubs in community breeding and have as many as possible purchase bulls of the same breed. Each member will submit the breed of bull he wishes to secure, together with age and maximum price he is willing to pay. This order will be forwarded to the Live Stock Branch and bulls purchased within the county if possible and if not in adjoining counties and shipped to a central point and distributed to the members of the club.

During the winter months an effort will be made to interest the club in live stock breeding, feeding, etc., through the use of motion pictures, lecturers, circular letters, bulletins, etc. It is also hoped that the club will serve as a medium for exchange of bulls later on.

The Department is working in close co-operation with the Ontario Cattle Breeders Association and will have their assistance in locating bulls, encouraging the organization of clubs and also in interesting the pure bred breeders in the movement with the hope that they may be prepared to offer animals at reasonable prices having in mind future business.

The Department fully realizes that this problem is not an easy one and not likely to meet with immediate results. However, the more general use of pure bred sires is of great importance to the live stock industry of the Province and for that reason every effort will be made to make the campaign as effective as possible.

EXPERIMENT WITH STANDARD HOG FEED

BY J. P. SACKVILLE, B.S.A., ASSOCIATE PROFESSOR OF ANIMAL HUSBANDRY

TO meet the need for increased production of live stock in general, and hogs in particular, early last year arrangements were made by the Ontario Government for a supply of concentrate feed suitable for swine. Indications at that time did not point to an early cessation of the war and in view of the abnormal demand upon ordinary cereals for human consumption it was thought advisable to make provision for a supply of suitable stock feeds in order to release our ordinary farm grains for other purposes. During the summer and early fall of 1918 a considerable quantity of the swine feed was available and assisted very materially, in supplying feed for the finishing of the large number of hogs that the Ontario farmers then had on their farms. This product was known as standard hog feed. The following, taken from a pamphlet issued by the Ontario Department of Agriculture, gives a fairly good idea of the composition of this feed.

The standard hog feed must conform to the following:

"The swine feed shall consist of at least 6 per cent of tankage, 10 per cent oil meal, 20 per cent of wheat or rye shorts, half of which may be made up of finely ground wheat bran,

33 per cent of corn or hominy; the balance of the feed shall be made up of one or more of the following: Corn feed, barley feed, wheat bran, or any other feed that may be from time to time approved by the feed committee. Provided also that the completed feed shall contain not less than 16 per cent of crude protein, 4.5 per cent of fat, and not more than 6 per cent of crude fibre."

The Animal Husbandry Department of the Ontario Agricultural College has recently completed an experiment commenced early this year to ascertain, if possible, the actual feeding value of standard hog feed.

Fifteen hogs were divided into three groups—five in each lot. Lot 1 was fed standard hog feed. Lot 2 was fed a ration of a mixture of three parts barley to one part oats. Lot 3 was fed a ration consisting of equal parts of the ration fed to Lot 1 and Lot 2. Each lot was given a preliminary feeding period of fifteen days previous to the commencement of the test. The test period was started Jan. 27 and finished April 24 (87 days). Each lot was weighed once a month and the amounts of the various rations fed were carefully checked.

Lot	Initial Weight Jan. 27	Final Weight April 24	Total Gain	Daily Gain	Feed Consumed	Pounds fed for 1 pound pork
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	
1.. . . .	593	1,055	462	1.06	1,236	2.69
2.. . . .	607	993	386	0.886	1,260	3.26
3.. . . .	585	1,061	476	1.09	1,284	2.67

The standard hog feed cost \$57 per ton and at this rate it cost 7.609 cents per pound for 1 pound of gain in Lot 1.

Lot 2 made a gain of 386 pounds on 1,260 pounds of the barley and oat mixture. This would figure

\$1.11.8 per bushel for barley, and 79.22 cents per bushel or 2.33 cents per pound for oats. In other words when oats and barley are selling for more than the figures quoted above, standard hog feed will give more economical gains; or if selling for

less than the figures mentioned oats and barley would be a more economical mixture than the standard hog feed. Putting it still another way with oats at 75 cents per bushel and barley at \$1 per bushel the gain in Lot 2 would be made at the rate of 6.98 cents per lb. as compared with 7.609 cents in case of Lot 1 when standard hog feed was used.

Valuing Standard Hog Feed at \$57 per ton, barley at \$1.11.8 per bushel and oats at 79.22 cents per bushel then Lot 3 made a pound of gain at a cost of 6.95 cents. When barley and oats was used as half the meal ration combined with standard hog feed in Lot 3, one hundred pounds of pork was produced 65 cents cheaper than in Lot 1 on standard hog feed alone. Valuing barley at \$1 per bushel and oats at 75 cents per bushel then 100 pounds of pork was produced in Lot 3, 92 cents cheaper than in Lot 1.

This experiment would go to show that standard hog feed has given very good results either alone or in conjunction with ordinary farm grown feeds. Cheaper gains were obtained, however, when fed with other grain such as barley and oats. Compared with a ration of barley and oats at prevailing prices during the feeding period standard hog feed did not give as economical gains.

The figures given in connection with this experiment do not represent the actual cost of producing pork. In addition to the meal ration a considerable quantity of by-products such as skim-milk and whey was consumed for which no credit has been given. Further, no charge has been made for other various items that should be considered such as labour, interest and use of buildings.

PROGRAMME FOR WOMEN'S INSTITUTES

BY GEO. A. PUTNAM, B.S.A., SUPERINTENDENT

IN outlining activities for the Institutes for "after the war" programme, it is unnecessary to emphasize the fact that, after more than four years of war work, the members will be more inclined than ever to devote their energies to the practical—practical in the sense of essential service to the community by the institutes, which well deserve the reputation for giving prominence to essentials from the standpoint of home and community welfare, which will be a factor in leading many, who are seeking something to take the place of their Red Cross and other patriotic effort, to decide to join the ranks of the more than 30,000 women's institute members in Ontario.

The work which characterized the institutes during their early history has an added importance in the present age of scarcity and high prices of food and clothing. Therefore, we may expect practically all the Institutes to devote much atten-

tion to food and clothing problems. Food production, conservation, comparative food values, methods of cooking, substitutes for meats, increased use of fish, the value of leguminous plants, the best utilization of skim milk and butter milk and the value of butter and cheese, etc., will be emphasized. The choice of suitable materials and sewing in the home with remodelling of clothing will be given prominence. Child life, the Architecture of the Home, Home Management, Home Surroundings, Labour Saving Devices, Hygiene, Sanitation, Agriculture for women, Canadian Literature, Travel Talks, Nature Study, etc., will continue to have a place in the regular programme.

HEALTH PROBLEMS

Health problems in general are attracting the attention of the institutes more and more, a result due in part to the medical inspection and demonstration-lecture courses in home nursing and first aid carried on

by the institutes in various sections of the province. The aim of the institutes branch has been realized in creating a public opinion which has resulted in the Department of Education undertaking to complete the survey of the rural schools of the province, employing doctors to do the inspection and nurses to do the follow-up work and to encourage the employment of officials to carry on the work from year to year. The real value of medical and dental inspection is realized only where the necessary operations and treatment follow. This has been encouraged with much success in the initial work and, no doubt, the Department of Education will give prominence to this feature. The institutes are being asked to co-operate in all this work.

The institutes will be of assistance in introducing domestic science into the rural schools, combining therewith the hot lunch for the pupils at the noon-hour.

DEMONSTRATION LECTURES

There was a growing interest from year to year, even during war time, in the demonstration-lecture work, especially in so far as home nursing and first aid were concerned, although domestic science and sewing courses were asked for in many centres. Now that the institutes will not have to give up war work for a couple of weeks in order to take these courses, the prospect is that they will become a very prominent feature of the work.

In addition to the regular two weeks' courses along practical lines as indicated above, many branches plan for demonstrations by their own members. These include: needle-work—making of button holes, darning socks, re-modelling clothes, mending, patching, etc.; canning fruits and vegetables, and various lines of cookery, exhibits of work by members are also of interest and value. These include: inexpensive Christmas gifts, homemade labour saving devices, knitting and crocheting work, dressed poultry, exhibits and sales of homemade cookery, etc.

Among the community activities are found the serving of lunches and teas at the fall fairs, supplying hospital needs, encouraging and supporting school gardens, establishing and supporting libraries, installing drinking fountains for schools and in public places. The institutes are gradually consolidating their position as rural centres for women's activities of all kinds and are thus becoming a permanent factor in rural life.

REPATRIATION.

The programme of repatriation is very broad and already the institutes are being looked to for support and co-operation. They are being asked, in the first place, to make the returned men, their own and those who are coming to the community for the first time, entirely at home, not in the old way, by being made welcome to take advantage of the regular routine of customary entertainment, social events and services in the community, but to arrange for special entertainemnt and social occasions for the returned men, and to make the wives of the new comers welcome to the institutes and other local organizations.

The overseas settlement board has already approached the institutes branch for co-operation in placing women in agricultural and domestic service in the rural districts.

The institutes realize that the rural children, in spite of all the healthful advantages of the country, are not, on the average, as well developed physically or mentally as the city children. The conditions have been reversed since the introduction of more scientific supervision in the cities. The institutes will, therefore, follow up more vigorously what they have already begun towards a better physical development for rural Ontario.

THE HOME AND SCHOOL

A more systematic effort will be made, in co-operation with the Department of Education, to unite more closely the bond between the home and the school. No doubt, many

home and school clubs will be formed under the guidance, in most cases, of a special committee appointed by the institute.

Keen interest is being taken by the institutes in the establishment of community halls, which provide for assistance on the basis of 25 per cent of the cost, up to a maximum payment by the government of \$2,000.00. Information giving the Act, regulations and suggestions as to plans for hall, reading room, kitchen, athletic field, etc., will be furnished.

The institutes are also asked to co-operate in encouraging the establishment of consolidated schools. Already they are active in this line.

TRAVELLING LIBRARIES

No doubt, travelling libraries will be taken advantage of to a larger extent, with the natural development of permanent libraries in many centres. More interest is being taken in the introduction of suitable games and amusements for the rural children and grown-ups. This feature will be encouraged and liberally supported by the institutes in connection with community halls.

Institutes are, as a provincial organization, taking keener interest in problems affecting women and children. The organization is purely non-partisan and non-sectarian and their influence will be all the greater because of this when they ask for what the women and children need as a matter of development, better health and security for the future.

Keen interest is being shown by the institutes in the housing problem. Farmers' wives are appreciating more and more from year to year the necessity of furnishing suitable cottages for the farm help, if they wish to insure all-the-year-round labour on the farm.

The institutes have been most liberal in furnishing funds and supplies to local hospitals, and have been a factor in establishing hospitals in a few centres. No doubt, this splendid work will be still more liberally supported.

Many institutes appoint committees to deal with lines of work brought forward by other societies: neglected and dependent children, support of shelters, war savings stamp campaign, labour bureaux, etc.

Full advantage will be taken of the splendid collection of material made available through Macdonald Institute, Guelph. The collection is grouped as follows:—

1. The Home—general articles; the family.
2. The House—evolution; plans; sanitation; furnishing and decorating.
3. Food—general information; storage; marketing.
4. Dietetics—dietetics and standards; nutrition investigations; diet for different ages.
5. Health topics.
6. Economics in the Home—general; standards of living; finances.
7. Education—general; physical; normal; in Home Economics; industrial and vocational.
8. Social—ethics; social service; domestic service; festival seasons; entertainments.
9. Miscellaneous—articles on variety of subjects not included above.

TEMPERANCE WORK

There is a keen interest taken by the institute members in the coming referendum on temperance. Plans are being made to inform them on what the referendum means, registration, voting, etc.

While the institutes are supposed to be thoroughly practical, the members appreciate the importance of having a certain amount of entertainment, which includes singing, violin, harp and piano selections, dialogues, debates, recitations, short plays, contests for prizes, games for grown-ups and young people, physical drill, dancing, etc. Speakers and entertainers outside the institute are often secured for open meetings to which every person in the community is made welcome. When the programmes include something to see, something to hear, and something to do on the programme, it insures continued interest and general benefit.

ORGANIZATION

Many applications are coming in for organizing at new points. The officers of existing branches, together

with the regular organizers of the Department will attend meetings with a view to forming new branches.

Increasing interest is being taken by district officers and the leaders in various branches to co-ordinate the work in each institute district.

The programme for the institutes might be indefinitely extended, for

there is no limit to the field of women's efforts in their relation to the home and the community. The progressive officers will have difficulty in selecting from the large variety of possible subjects, rather than in finding a sufficient number of attractive and helpful topics for one meeting a month.

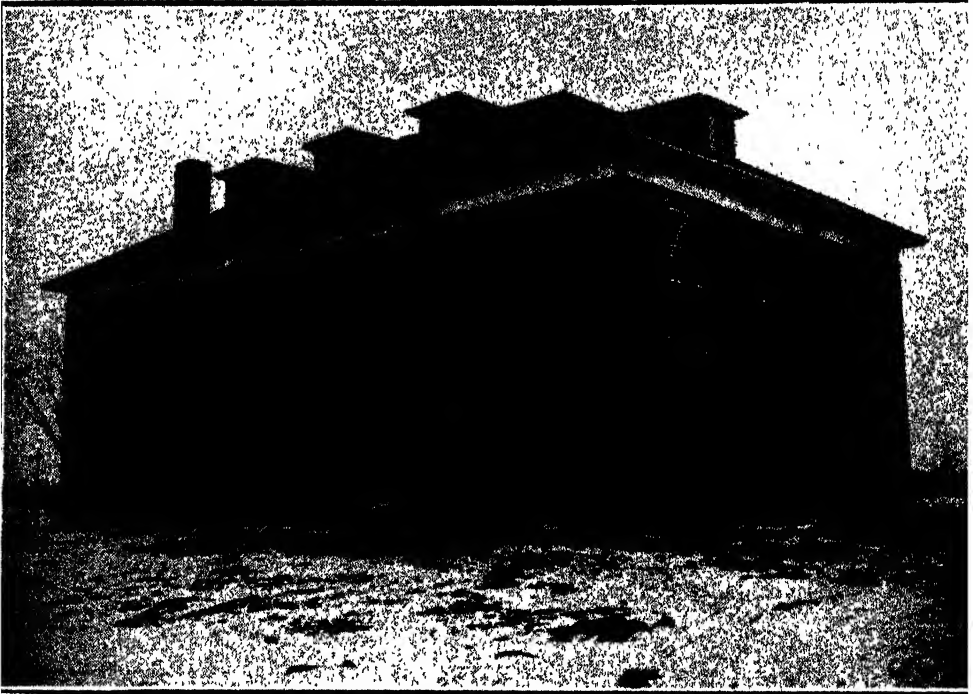
KEMPTVILLE AGRICULTURAL SCHOOL

BY W. J. BELL, B.S.A., PRINCIPAL

THE live stock judging pavilion at the Kemptville Agricultural School is now completed. This is a two story building of solid brick with dimensions 85 feet x 51 feet.

will be used as a gymnasium. A new implement shed on the farm has been also completed.

Work on the main school building, which will be 120 feet x 61 feet and



STOCK JUDGING PAVILION

The lower floor, besides the large judging ring surrounded with raised seats, contains the Principal's office. The second floor is arranged for lecture purposes, but on completion of the main school building this part

three stories high, is now in progress. This building is supposed to be completed by fall and will be fitted with class-rooms and laboratories for instruction in agriculture and household science. It will also contain offices

for the staff. In addition, I expect, we shall erect this year a building in which farm mechanics will be taught. We are also constructing a large closed shed for the accommodation of the horses of farmers attending short courses or visiting the school or farm. This building will also be available for the accommodation of pure-bred live stock which will be sold at sales held in our judging pavilion.

Our live stock has been increased by the addition of an imported flock of Shropshire sheep purchased last fall. To the dairy herd we have added a number of choice heifers of dairy breeds.

In accordance with our landscape plan we have done considerable planting of shade trees on the farm during the spring.

A SURVEY OF 340 DUNDAS COUNTY FARMS

IN a pamphlet recently issued by the Department of Farm Management, at the Ontario Agricultural College, a complete report of the survey of 340 Dundas County farms is given. The purpose of this survey was to investigate the dairy farming business in Eastern Ontario in much the same way as it had been done in Oxford County, eastern Ontario. In both instances a number of average farms were selected, from which conditions were studied according to the methods adopted in Oxford county the previous year.

In the County of Dundas there are three markets for milk—the cheese factory, the condenser, and the city (Montreal) wholesale trade,—hence this county was selected as typifying the general dairy conditions in eastern Ontario. In the pamphlet full information is given regarding methods of collecting data, factors influencing labor income, etc. On completion of the analysis of the data collected the following conclusions were reached:

1. That while the average large farm produces a larger Labor Income than does the average small farm, it is possible, by proper organization, to raise the Labor Income of a farm of 75 acres or more to a reasonably substantial figure.

2. That the clearing up or draining of waste land on a farm already established, is a profitable investment at as high a cost as \$90 per acre.

3. That the quality or producing capacity of the farm live stock is the most important factor in the dairy farming business.

4. That a high crop yield tends to produce a high Labor Income but may easily result in a loss if fed to poor stock.

5. That the grade herd sire will be doomed by all stockmen who study Table No. 6 of this pamphlet.

6. That all-year dairying permits of a better organization of farm business than does summer dairying—with profits increased accordingly.

7. That the most profitable degree of specialization in dairy farming is governed entirely by the selling price of milk:—

(a) If that price be more than \$2.00 per cwt. specialization up to 90% of the total income is profitable.

(b) But if the price be less than \$2.00 per cwt., side-lines must be utilized to produce at least 30% of the total income.

(c) No matter what the price the dairyman cannot afford to neglect all side-lines.

8. That the average producing capacity of the dairy herd determines whether or not it is advisable to increase the farm expenses for labor and feed. The Labor Income may be kept up by extreme hard work on the part of the operator, but good cows will more than pay for the hiring of extra help, and thereby lessen the amount of work per man to be done on the farm.

9. That the cost of producing milk on 194 Dundas County farms ranged from \$1.00 to \$4.00 per cwt., depending on the farm efficiency.

10. That the average cost of production of milk could be reduced by better breeding, more careful feeding and proper utilization of side-lines.

This survey, as well as the former one, was carried on under the supervision of Professor A. Leitch of the Ontario Agricultural College, with funds provided in part through THE AGRICULTURAL INSTRUCTION ACT.

AGRICULTURAL REPRESENTATIVE ACTIVITIES

REFORESTATION

BY W. M. CROSKERY, B.S.A., GRENVILLE COUNTY

ONE thousand Scotch pines and one thousand poplars have been received from the Ontario Forestry Branch and set out on the sand hills in this county along the Ottawa and Prescott Highway. A number of these were used to fill vacancies in the plantation set out some years ago. Most of the trees originally planted are growing well.

DISTRIBUTION OF SEEDS AND EGGS

BY E. K. HAMPSON, B.S.A., WELLAND COUNTY

THE children of the school clubs in Wainfleet township were brought together to receive the seeds and eggs distributed this year. One hundred and fifty children attended. Occasion was taken to display motion pictures having an educational value. A film on medi-

cal inspection of schools led to the application of one of the teachers to have the inspection carried out at her school. The trustees approved of the scheme. I shall endeavour to organize the township as a whole and have the work undertaken.

HALDIMAND COUNTY

PURE BRED LIVE STOCK ASSOCIATIONS

BY G. L. WOLTZ, B.S.A.

A COUNTY organization designed to encourage the breeding of pure bred live stock is under way. Already a considerable number of choice pure bred animals more especially cattle, have been brought into the county. The asso-

ciation will take an active part in the co-operative bull club movement and the campaign to eliminate the scrub sire. A census of pure bred stock breeders is being taken preparatory to final organization.

SCHOOL GROUND IMPROVEMENT

AS a result of a special prize being offered by the county to the school section making the greatest improvements in school surroundings and conveniences, our services have been much in demand tendering advice in relaying our school grounds, planting hedges, and establishing perennial borders. The movement is doing a great deal towards making permanent improve-

ments to our rural schools. My visit to the various schools also gave me a splendid opportunity to demonstrate to the pupils some special work of interest, such as the use of pruning instruments, laying out lawn and flower beds and the transplanting of trees. In nearly every case, trustees and sympathizers were present with horses and necessary working material, to lend a hand.

COMMUNITY CENTRE MOVEMENT

THE farmers' club at Cayuga is taking advantage of the legislation passed at the recent session of the Ontario Legislature by which the provincial department of Agriculture provided assistance in the establishment of community halls. An organization has been effected known as "Green's Commu-

nity Centre." A new hall is being built as well as closed sheds for the protection of horses of farmers who drive into town. The funds required, above those provided by the new Act, are being secured by public subscription. Other centres are likely to be organized in the county within the next year.

MANITOBA

SPECIAL COURSES IN DAIRYING

BY PROFESSOR R. W. BROWN, B.S.A.

TWO courses that may be regarded as special are provided by the Manitoba Agricultural College. One of these is for returned soldiers and the other for sanitary inspectors.

COURSE FOR RETURNED SOLDIERS

The special course for returned soldiers occupies about four months. Each class is given a course in Dairying extending over a period of one month. The periods in which the students get actual practice are one hour and a half in length. There is one such period each day for five days of the week. Besides these periods for practical work, there are two forty minute lecture periods each week.

The work taken up and studied may be briefly outlined as follows:—

A study of the equipment and utensils necessary in the production of milk and cream; the main sources of contamination of milk and the care necessary to keep such contamination at a minimum; hand milking and the operation and care of milking machines.

Work on the operation and care of some eight to ten different makes of hand and power cream separators suitable for the farm is then taken up. The operation of the Babcock

test as applied to milk, cream, buttermilk, skimmilk and whey is gone into thoroughly. The use of the lactometer is also taken up in conjunction with the Babcock test. Students also get some practice in home butter and cheese making, and study briefly the relative food values of milk and its products and other common foods.

It is planned to give instruction in such work as should be of considerable interest and assistance to farmers and common knowledge to people in general.

COURSE FOR SANITARY INSPECTORS

The course for sanitary inspectors is designed to meet the requirements (as far as a knowledge of dairying is concerned)—of candidates for the examination for Inspectors of Nuisances under the Public Health Act. The examination is set by the Royal Sanitary Institute of Great Britain. The students for this course are fifteen returned soldiers who are taking an eight months' course in Sanitary Inspection in the City of Winnipeg, under the direction of F. W. Dudley-Ward, M. R. San. I., F.I.S.E. Three periods per week of three hours each, for six weeks are given to the study of dairying. An endeavour is made to give such work as will not only fit students to inspect but will enable them also

to give sufficient instruction to bring about desired improvements in the production of milk and cream for town and city trade.

A thorough course is given in the uses of the Babcock Test and the lactometer, including their application in the detection of skimming and watering of milk, the practical application of sediment tests, acidity tests, the Storch test, the foam and Waterhouse tests to distinguish oleomargarine from butter, moisture and fat tests as applied to butter and cheese and the test for salt in butter, etc. Instruction and practice are also given in the detection of milk and cream preservatives and adulterants.

Considerable attention is paid to

the inspection and scoring of dairy barns, milk houses, milk plants and milk shops. A limited amount of time is spent in the grading and scoring of milk and its products, and to the study of their relative food values. Demonstrations on the judging of dairy cattle are given and also a few lectures on the economical feeding and management of dairy cattle and the construction of sanitary dairy buildings.

In advising returned soldiers to take the afore-mentioned course for sanitary inspectors, it is the hope of the provincial health authorities that legislation will soon be obtained whereby each municipality in the Province will be required to appoint a qualified sanitary inspector.

GOPHERS KILLED IN COMPETITION

BY S. T. NEWTON, DIRECTOR, EXTENSION SERVICE

THE reports of the gopher competition in this province which began on April 1st and ended May 24th conducted through the boys' and girls' clubs show that about 450,000 gophers were killed. Of these 21,000 were pocket gophers. The Department of Agriculture gave a bounty of 2½c for all gophers that were not pocket gophers, and 25c for all pocket gophers.

It is rather strange that in Manitoba there were very few people who knew that the pocket gophers were bad, namely owing to the fact that they do not come out but at night, and it is difficult to get them

except by trapping. Hence, the number caught, namely over 21,000 is remarkable. The largest number caught at any one school was at Winkler, where there were 1,609 pocket gophers and 8,154 other kinds. The pupils of one of the rural schools in southwestern Manitoba near Pierson, caught over 3,000 gophers. Many one-roomed schools have over 2,000 to their credit.

In general, pocket gophers were more numerous in the Red River Valley, while the others killed were mostly from southwestern and northwestern Manitoba.

AGRICULTURAL REPRESENTATIVE SERVICES

THE agricultural representative work in Manitoba was seriously interfered with by the war owing to the enlistment of a number of the representatives. There are now five representatives in the province, who are situated at Portage la Prairie, Dauphin, Virden, Selkirk, Morden, and Brandon. At places where there are no representatives

the regular members of the extension staff of the department carry on special features of representative work. These special features include work with farm crops, horticulture, poultry, and farm accounts.

The agricultural representative is supported by the Department of Agriculture and the local community served. The department pays the

salary up to \$1,800, also his travelling and living expenses when not at headquarters. The local community pays his salary from \$1,800 to \$2,500 and provides for office expenses.

At each place where an agricultural representative is appointed, a board of agriculture has been organized. This board consists of from nine to twenty members, depending on the number of municipal councils, agricultural societies, grain growers' locals, and others who co-operate as committees with the representatives. This board meets two or three times during the year. It is split up into

committees and each committee meets with the representative at least once a month. The amount of territory covered by each agricultural representative is approximately twenty-five miles square.

Agricultural representative work is also carried on by representatives of the rural credit societies. These representatives are located at Gladstone, Swan River, and Roblin. While it is their first duty to look after rural credit society work, they spend about half their time on agricultural representative activities.

SASKATCHEWAN

BUTTER GRADING SERVICE

BY PERCY REED, DAIRY COMMISSIONER

THE grading of butter on a commercial basis was first instituted by the Saskatchewan Department of Agriculture in 1914. That year the output of all the co-operative creameries in the province was graded, and certificates issued covering each churning. In 1915 the service was extended to include all creameries operating in the province, and since that year there has been a very rapid development in the work.

During 1918, 4,993 samples were scored for 31 creameries. These samples represented 3,220,476 lbs. of butter. This was an increase of 29.08 per cent over the quantity graded the previous year. The butter grading year ends April 30, thus running concurrently with the fiscal year of the province. The government's grading service is offered free to all creameries in the province and a number of important changes in the work are provided for in this year's regulations. One of the chief of these is that grade certificates were issued, one for pasteurized and one for unpasteurized butter. This year's regulations, however, provide

that "Grade certificates will only be issued on butter manufactured from cream which has been effectively pasteurized", and the next succeeding clause describes effective pasteurization as follows: "Effective pasteurization shall be considered to mean heating to at least 170 degrees F. and holding for ten or more minutes. We would, however, recommend heating to 180 degrees or higher to ensure keeping qualities. Where the flash system is being used a minimum temperature of 185 degrees F. is required." The Storch test is being used regularly and, while all samples submitted are scored and duplicate copy of the score cards sent to the buttermaker, grade certificates are refused on any sample showing a positive reaction on the test.

Previous to 1918 grading was done on the commercial package but that year the system was changed and it was required that a fourteen pound sample from each churning be submitted to the grading station. This system of grading on the 14 pound package is being continued for the present year and a churning report giving details of the manufacture from

the handling of the cream to the packing of the butter must also be sent to the grading station with the sample box. A percentage of these grading samples are held in cold storage and re-scored for educational purposes and by considering these re-scores, together with the detailed churning reports, data of great educational value is being collected.

In addition to the Storch test above mentioned moisture tests are being made on each grading sample submitted and grade certificates will be refused on any churning found to contain more than the legal standard of 16 per cent moisture.

Owing to the different methods used there is no very direct relation as between different creameries in the percentage of salt used and the percentage incorporated in the finished butter. In view of this, frequent salt tests will be made during the coming season, and by advising the different buttermakers of the salt content of their finished butter and where possible securing a report from the trade on that butter, it is hoped that the graders will be placed in a position to give more definite advice in this regard than was formerly possible.

Reports received at the Dairy Branch indicate that the winter output of the creameries is well in excess of that of the same period a year ago. Five new creameries are being established and with a favourable summer season Saskatchewan's creamery output for 1919 should show a marked increase over 1918.

The benefits of butter grading to the creamery manager are now recognized not only because of the educational value but also because the grade certificate has come to have a distinct commercial value in our best markets. Grading stations are being operated at Regina and Saskatoon, and in view of the above a busy season's work is expected at each point.

OFFICIAL GRADING BUTTER FOR 1919

1. Grading depots will be established at Regina and Saskatoon.

2. Grading will be done on 14 lb. samples and manufacturers wishing butter graded

will forward to the grading depot a 14 lb. box from each churning to be graded.

3. These boxes must be forwarded by express or cool car (charges prepaid) as soon after being packed as possible, or at least once each week addressed to the Dairy Commissioner at the cold storage warehouse at which the butter is to be graded.

4. Each sample must be plainly marked on the upper left hand corner of one end and with the specific mark allotted the creamery at which it was manufactured and the serial number of the churning from which it was taken.

5. When samples have been graded score cards will be forwarded to the manufacturer.

6. Churning report forms will be supplied by the Dairy Branch to manufacturers wishing to have butter graded. One of such forms filled out in detail must accompany each sample.

7. The right is reserved by the Dairy Branch to retain sample packages for re-scoring. Manufacturers will be advised from time to time when their samples are available for market or shipment.

8. When butter is sold it will be necessary for the manufacturer to forward to the Dairy Commissioner, Regina, a memo. giving the number of each churning included in the sale, and the number of boxes from each, as well as the name and address of buyer. Upon receipt of this information grade certificates covering the shipment will be forwarded direct to the purchaser of the butter or to the consignee.

9. It is understood that the manufacturer, to prevent deterioration as far as possible before shipment, will hold butter in a proper storage at a temperature below 15 degrees F.

10. To further protect the grade certificate the Dairy Branch reserves the right to inspect or regrade butter held in private or public storage before issuing grade certificates for same.

11. Grade certificates will only be issued on butter manufactured from cream which has been effectively pasteurized.

12. Effective pasteurization shall be considered to mean heating to at least 170 degrees F. and holding for ten or more minutes. We would, however, recommend heating 180 degrees or higher to ensure keeping qualities. Where the flash system is being used a minimum temperature of 185 degrees F. is required.

13. The grade certificate is of vital importance to the dairy industry of the province and every precaution should be taken by the manufacturers as well as the Dairy Branch for its protection. The right is reserved to withdraw the grading service from any manufacturer who has been found guilty of tampering with marks or in any way misrepresenting his butter. If grading privileges are withdrawn, the produce trade will be notified promptly.

14. It is the desire of the Dairy Branch that in so far as possible the grade certificate shall represent the quality of the butter covered by the certificate at the time of

arrival at the final destination or at a point of consumption, and in order to facilitate this, car lots will, wherever possible, be regraded on request immediately before shipment. In cases where the regrading is done on the commercial package or at places other than grading depots, the owners of the butter will be responsible for the travelling or other expenses incurred by the grader while engaged in the work.

NOTE.—The use of a standard 14 lb. box, $8\frac{1}{2}$ " x $9\frac{1}{2}$ " x $5\frac{1}{2}$ " inside measurements and with the end sections not less than $\frac{3}{4}$ " in thickness is recommended for all grading samples. Uniformity in these packages would be a great advantage and creamery operators are requested to specify this type of package in ordering new supplies.

Although the grade of any given churning of butter is based largely upon its score for flavour, workmanship is an important contributing

factor. Each creamery operator should assure himself that all butter made under his direction whether put up as grading samples or in commercial packages shows uniformly good workmanship. Boxes should be well made, clean, evenly coated with paraffin wax on the inside surfaces, and plainly marked. Good quality of parchment paper linings should be used and neatly arranged to completely line the box. The butter should be solidly packed, full weight and with a smoothly finished surface. Care should be exercised to ensure that commercial packages correspond in every detail, including marking, with the sample package submitted for grading.

ALBERTA

RECENT AGRICULTURAL LEGISLATION

BY JAMES MCCAIG, CHIEF PUBLICITY COMMISSIONER

THE following Acts, having direct bearing on agriculture, were passed at the second session of the fourth legislature of the province of Alberta.

The Municipal Districts Seed Grain Act.

This Act follows that of last year, but has certain amendments. The Act now provides for an advance of \$300 in value for seed grain only per quarter section or for \$350 for seed grain and feed, of which \$90 may be for feed in any year, the same to be secured by lien on the crop and on the land. The maximum amount against any quarter section at any time shall not exceed \$600 for seed or \$650 for seed and feed. Where the consent of the owner of the land cannot be obtained, the municipal district may make the advance without the lien against the land by taking lien on crop and a mortgage on the borrower's goods and chattels on a prescribed form.

Liens and mortgages must be registered within sixty days instead of thirty as formerly.

An Act Respecting Advances for the Purchase of Seed Grain and Feed and the Securities for the Repayment Thereof.

This Act is somewhat similar to the Seed Grain Acts of the past two years and applies to lands outside of municipal districts. Under this Act the following may make application for assistance:

(1) Owners of patented lands, and the wives and other representatives of owners who are on active military or naval service;

(2) Occupants and the wives or other representatives of occupants who are on active military or naval service. Occupants are required to obtain the consent of the owner to any advance, and both owner and occupant should sign the statutory lien; but it is provided that in any particular case the Provincial Treas-

suror or the Minister of Agriculture or any person authorized by either of them in writing may, by writing, dispense with the consent or signature of the owner otherwise required.

The application may be for an amount not to exceed \$300 for seed grain alone for each quarter section, or for \$360 for seed and feed, of which \$90 may be for feed, or for \$100 where feed alone is required.

In addition to the right of recovery by suit and execution against which there are no exemptions, and the lien on all grain grown upon the land in respect of which seed grain or seed grain and feed or feed or money for same has been advanced under this Act, the Provincial Treasurer or the chartered bank or other person making the advance may take security by any or all of the following methods;

(a) Promissory note, payable November 1, 1919, with interest not to exceed 8% per annum;

(b) Mortgage on real estate, to be registered and discharged without fee;

(c) Mortgage on goods and chattels, to be registered and discharged without fee, with no time limit for registration and no necessity for renewal;

(d) Seed grain lien on land, to be registered and discharged without fee.

Penalties are provided for making use of seed grain or money advanced for the purchase of same for any other purpose than that for which the same was obtained.

The Mortgagees' Seed Grain Security Act.

Under this Act any mortgagee of land may advance seed grain, seed grain and feed or feed only, or money to purchase same, for such amount and time and for such rate of interest as may be agreed on, together with reasonable costs for inspection, solicitor's fees and disbursements, taking from the mortgagor an undertaking, in form provided by the Act, which, on registration for a fee of fifty cents, is attached to and practically becomes

a covenant of the original mortgage, with all the rights, remedies, duties and obligations thereto appertaining.

It is provided that the covenant to pay the amount of the undertaking shall not apply to any previous registered owner, and that the undertaking shall not be filed where there are registered encumbrances to the mortgage, unless the consent in writing of the persons entitled is attached thereto or endorsed thereon.

The mortgagee is given power to file a lien on all the crop grown on the land covered by the undertaking, for seed or an advance for seed, whether the land has been seeded with seed advanced or seed purchased by money advanced by the mortgagee or otherwise.

An Act to Amend the Women's Institute Act

The amendments provide for the incorporation of Women's Institute Girls' Clubs by any eight or more girls of not less than twelve years of age, with such social, literary, educational or recreational objects as may be approved of by the Provincial Advisory Board, who are empowered to make regulations respecting the formation, government and operation of the clubs. Provision is made for an annual grant of \$5.00 to each club.

An Act Respecting the Purchase and Sale of Eggs

No person shall buy, sell or have in possession for sale unwholesome eggs. First handlers buying from producers must candle the eggs and reject bad ones. Eggs placed in cold storage for more than sixty days must be candled and packed in dry cases with new fillers and flats. Inspectors appointed by the Minister shall have power to enter any premises where eggs are sold and inspect all eggs on hand.

Every person violating this Act, shall, on summary conviction, be liable to a penalty of not more than \$100 and costs.

An Act to Amend the Dairymen's Act

Amendments provide the standard sample of cream taken by the Babcock test shall weigh neither more nor less than eighteen grammes.

Inspectors are given authority to weigh and take samples of milk and cream.

The provision for a license fee of \$5.00 for creameries, cream stations, cheese factories and testers and graders of milk and cream is repealed, and the amount of such fee shall in future be fixed by regulation.

The license to operate a milk or cream testing apparatus is made valid to the 1st of January following issue.

An Act to Amend the Irrigation District Act

The expression "owner" has been changed to mean and include "A registered owner in possession or a mortgagee in actual possession, or if neither of such persons exist, any person being an equitable owner by reason of an agreement for sale, and with respect to Crown land an occupant thereof holding under homestead or pre-emption entry." The qualification of voters and the form of oath to be taken by a challenged voter has been changed accordingly.

The vote on the formation of a district has been amended to be carried if it shows that a majority composed of at least two-thirds of the persons who have voted is in favour of it.

The time within which authorization to construct irrigation works shall be obtained, or a contract be entered into, has been extended from six months after the date of the Order creating the district to two years.

Occupants of Crown lands on homestead or preemption entry are made personally liable to taxation in respect of such land.

The total amount required to be raised formerly could not exceed \$25 per acre of the lands assessable.

This amount has been changed to \$50 per acre.

An Act Respecting the Taber Irrigation District

This Act validates and confirms the erection of the Taber Irrigation District, the election of trustees and all proceedings had and taken by the said trustees prior to the date of this Act. It also extends the period within which authorization may be obtained or a contract entered into by the said district for six months from the date of the coming into force of the Act, and gives the Lieutenant Governor in Council power to direct a further extension of such period from time to time.

An Act to Amend the Reclamation Act

Provision is made by which the Dominion Government may come under the Act as an applicant to reclaim vacant Dominion Lands by drainage. Such lands, when reclaimed, shall be offered for sale at auction within five years after completion of drainage works, except that it is provided that the Minister of Interior may;—

(a) Transfer any reclaimed lands to the Soldiers' Settlement Board at a valuation to be fixed by the Governor in Council;

(b) Let the said lands upon any yearly or lesser tenancy; or

(c) Sell any fractional part of any quarter section to the owner of any other fraction of the same section.

Every transfer, letting or other disposition of lands thus reclaimed shall be subject to the conditions for the maintenance of the works.

An Act to Amend the School Grants Act

To any village, consolidated or town district giving approved instruction in science and agriculture and related school gardening, there is provided an annual grant of fifty per cent (50%) of the board's expen-

diture on improvement and up-keep of a school garden and the value of approved equipment for such instruction up to a maximum grant of \$100.

STATUTE LAW AMENDMENTS

The Noxious Weeds Act

The Common Barberry and Toad Flax are added to the list of noxious weeds.

The Stallion Enrolment Act

No stallion which has been brought into Alberta and which is more than 24 months old shall be sold or offered for sale unless and until it has been enrolled under this Act.

The owner of every stallion standing or travelling for service shall report to the Department of Agriculture on or before the thirty-first day of December in each year the number of mares served by the said stallion during that year, and the said owner shall again report to the Department on or before the thirty-first day of May following the number of mares that proved to be in foal from the service referred to in such previous report, both of which reports shall be verified by affidavit, and shall be in such form as may be required by the Minister.

The Entire Animals Ordinance

Where stallions or bulls are unlawfully running at large and are captured and confined, the owner, if he does not within three days take away such stallion or bull, shall pay the captor for his trouble \$10 in the case of a stallion and \$5 in the case of a bull and 50 cents per day for sustenance.

An Act for Restraining Dangerous and Mischievous Animals

Any sheep which passes through, under or over any fence, whether lawful or not, shall be deemed to be a notoriously breachy animal, and

the owner thereof shall be liable in a civil action for any damage done thereby.

Notwithstanding any Act or by-law heretofore passed or any by-law that may hereafter be passed, no hog shall be allowed to run at large at any time in any part of the province, and the owner of any hog shall also be liable in a civil action for any damage done by it while running at large, whether or not the land upon which damage is done is surrounded by a lawful fence, and all hogs shall be deemed to be mischievous animals within the meaning of this Act.

The Minister may by order, published in *The Alberta Gazette*, prohibit in any specified area in such order defined, no part of which shall be within a municipal district, the running at large of any live stock in greater number than one hundred head of cattle or horses or five hundred sheep, or a proportionate number of any two or three such classes, for every 160 acres of land owned or occupied by the owner of such live stock within the area so defined.

Every such order upon publication and until repealed by order published in like manner shall be of the same force and effect as if enacted by the Legislature of the Province, and any violation thereof shall be an offence punishable on summary conviction by a penalty not exceeding \$100 and costs for each offence.

The Alberta Co-operative Credit Act

The minimum number for organization has been reduced from thirty to fifteen farmers, and the subscribed stock from \$3,000 to \$1,500, but no society shall commence business until it has thirty members and \$3,000 stock subscribed, with not less than 20 per cent paid up.

Power is given the directors to appoint as secretary-treasurer or secretary or treasurer a person who is not a member of the board of directors if they deem it in the interests of the society so to do.

The objects of the society have been extended to include the placing of fire and hail insurance.

Every bank from which loans are obtained by any society shall forward to the supervisor of Co-operative Credit Societies a monthly return showing each loan made by it and the amount authorized thereby, the amount advanced at the date of such return and also showing all loans, if any, then past due.

In addition to the loan on the chattels purchased with the proceeds of a loan, the directors may require further or other security by way of mortgage or assignment of property of any sort or otherwise howsoever, in such manner and form as may seem to them fit and proper, and they may assign such securities or any of them to the lender, together with all the rights of the society thereunder.

ALLOTMENTS FOR AGRICULTURE

Following are the allotments for agriculture for the year ending December 31, 1919.

Chargeable to Income	1918	1919
	\$ cts	\$ cts.
Civil Government.	45,480 00	48,000 00
Expenditure under Agriculture Societies Ordinance, including grants to Exhibition Associations at Edmonton and Calgary of \$5,000 each	105,000 00	115,00 00
To provide for expenses of Official Judges at Agricultural Exhibitions	8,500 00	8,500 00
To promote the work of Live Stock and Agricultural Institutes and Short Course Schools	12,000 00	10,000 00
To promote and encourage the production and to provide for the distribution of Seed Grain, and Provincial Seed Fair	6,000 00	9,000 00
Administration of Demonstration Farms		10,000 00
Live Stock Encouragement Act	16,000 00	15,000 00
Destruction of Grey or Timber Wolves and Coyettes, and protection of Game	27,000 00	28,000 00
Destruction of Noxious Weeds	25,000 00	25,000 00
Stock Inspection	12,000 00	30,000 00
To provide for expenditure in connection with Brands and publication of Official Brand Book.	12,500 00	13,500 00
Administration of Stallions Act	10,000 00	7,500 00
Collection and Compilation of Agricultural and other Statistics.	3,500 00	4,000 00
To promote and encourage Dairy Work	38,594 60	20,000 00
Operation of Schools of Agriculture and Demonstration Farms.	20,000 00	121,500 00
Administration and operation of Demonstration Farms	66,000 00	
Agricultural Representatives.		5,000 00
Collecting and mounting specimens for Natural History Museum.		500 00
Expenditure under Prairie Fires Ordinance (including \$1,000 for Police Service).		2,000 00
Publicity Commissioner's Office.		15,000 00
To promote and encourage Poultry Industry and operation of Egg Marketing Service		15,000 00
Women's Institutes and grants to same		12,000 00
Alberta's share Administration of Dominion Seed Grain Act		5,854 47
To provide for Free Shipment of Hay and Straw until April the 1st, 1919.		3,500 00
Miscellaneous grants.	17,100 00	17,200 00
To provide for increases in salaries on promotions or advances in grading by efficiency officers.		7,000 00
Agricultural and Special Statistics.	26,810 70	
Contingencies.		4,200 00
	451,485 30	552,254 47

Chargeable to Capital	1918	1919
	\$ cts.	\$ cts.
Purchase and Equipment of Demonstration Farms	4,000 00	104,000 00
To assist Creameries not exceeding \$1,500 to each Creamery . .	4,500 00	4,500 00
For encouragement and improvement of Draft Horse Breeding in Alberta; purchase of Pure-bred Stallions		35,000 00
To provide for advances under Elevator Act.	200,000 00	...
Total	208,500 00	143,500 00
Estimated Revenue		
Agriculture Department (\$181,500)—		
Fees: Game Licenses, Sale of Estray Animals and other Fees .	27,850 00	43,000 00
Repayment, Account of Seed Grain	1,500 00	5,000 00
Repayment, Loans to Creameries	1,000 00	1,000 00
Repayment, Account Destruction of Noxious Weeds . . .		1,000 00
Demonstration Farms	45,000 00	45,000 00
Poultry Breeding Plant	2,000 00	3,500 00
Registration of Threshing Machine	3,000 00	3,000 00
Brands	25,000 00	26,000 00
Stock Inspections	18,000 00	32,000 00
Live Stock Encouragement Act	5,000 00	5,000 00
Enrolment and Inspection of Stallions	15,000 00	7,500 00
Dominion Government, Grant <i>re</i> Greater Production Move- ment	25,000 00	9,000 00
Casual Revenue		500 00
	168,350 00	81,500 00

ALBERTA

CO-OPERATIVE MARKETING SERVICES

BY JAS. MCCAIG, CHIEF PUBLICITY COMMISSIONER

THE Department of Agriculture for Alberta has no administrative branch devoted to co-operative service and does not assist directly in the co-operative marketing of live stock. The organized marketing services under depart-

mental offices in Alberta are limited to the selling of dairy and poultry products by Commissioners in each case. The department gives assistance and encouragement to co-operative associations where assistance in organization is required or requested.

BRITISH COLUMBIA

THE BOARD OF HORTICULTURE

BY W. J. BONAVIA, SECRETARY, DEPARTMENT OF AGRICULTURE

THE Board of Horticulture for British Columbia was created by the Horticultural Board Act of 1892, which was amended in 1893 and consolidated in 1894. This Act provided that the Board should consist of the Minister of Agriculture and Deputy Minister ex-officio (the latter to act as secretary) and four

members to be appointed by the Lieutenant Governor in Council for the following sections of the province:

- (a) One for the province at large.
- (b) Vancouver Island and Gulf Islands.
- (c) Vancouver, Westminster, the Lower Fraser Valley and Coast districts up to Cassiar.
- (d) The third district comprises the interior valleys of the province.

The members were selected with reference to their practical experience in horticulture and were appointed for a term of four years; their remuneration was fixed at \$5 a day for the time actually employed, with mileage. A treasurer to the board was also appointed and an oath of allegiance was exacted from all members as to the faithful discharge of their duties.

The office of the board was located in the Department of Agriculture and was in general charge of the secretary; some of the duties originally including the receiving, managing and issuing of donations and bequests of money, etc., for promoting the objects of its formation, whilst meetings were to be held twice a year, or oftener, and measures were to be adopted for the promotion and protection of the horticultural industry.

Competent lecturers were to be appointed, without expense to the province, to visit the districts named above for the purpose of encouraging and improving practical horticulture and giving instructions in the best methods of treating diseases found in orchards, etc.

Powers were also given to the board to make regulations for the purpose of preventing the spread of contagious diseases in orchards and gardens, for the prevention and treatment of fruit pests, for the disinfection of grafts, fruit and fruit trees; whilst penalties were to be recovered in accordance with the "Summary Convictions Act."

The first chief inspector of fruit pests was Mr. E. Hutcheson, who acted from 1892 to 1894, but was succeeded by Mr. R. M. Palmer, who was inspector for eight years until 1902, being succeeded by the late Mr. Thomas Cunningham, a well known pioneer of British Columbia, who was largely instrumental in the passing of the above Act and a man who not only carried out the provisions of same effectively but who had the best interests of the horticultural industry ever before him. The inspector and his assistants were

given power to enter orchards and other premises with regard to the enforcement of the Act and where fruit pests or contagious diseases were discovered, to take action in the absence of the owner or upon non-compliance with a request to do what was necessary.

One of the important steps taken by the board was the requirement of bonds and licenses from nurserymen and other parties having for sale or importing fruit trees, plants and nursery stock. Bonds in the sum of \$2,000 were required and a right-of-action given to persons who bought fruit trees, plants or nursery stock, from nurserymen or agents that proved to be infected or not of the variety and character represented.

Amended rules and regulations of a very comprehensive nature were issued by the board on the 9th of June, 1905. These regulations, besides quoting the main provisions of the Act, included methods of treatment of nursery stock, listed a number of sprays for aphids, scale insects, scab and other fungous diseases and also gave a table of inspection fees and named the ports of entry where fruit might be inspected.

These regulations practically stand to the present day having been but slightly amended in August, 1915, February, 1916, and March, 1919, which speaks well for the careful consideration given by the members of the board to the requirements of the horticultural industry.

In the year 1911, the passing of the "Agricultural Associations Act" automatically cancelled the Horticultural Board Act and amending statutes, a section in the new Act being allotted to these matters, whilst the representation of districts in the province was increased on the board by providing separate members for the Okanagan and Kootenay Valleys and also by the appointment of a professional nurseryman to represent that industry.

In the year 1912 the office of treasurer was abolished, all fees received being paid direct to the Department of Agriculture and thence to the consolidated revenue fund. From this period, also, dates the gradual decline in the powers and usefulness of the board and the establishment of a Horticultural Branch of the Department of Agriculture with a provincial horticulturist in charge and a competent staff of experts. This necessarily offsets to a very large extent, the advisory and educational functions of the board.

Upon the death of Mr. Thos. Cunningham in February, 1916, the reorganization of the Horticultural Branch emphasized these conditions and by Order in Council dated the 10th of March, 1919, the original board passed out of existence.

In looking backward over the twenty-five years covered by the activities of the board, one realizes that the history of horticultural effort in British Columbia has been very largely moulded by the policy of the board, and that although

changing conditions have brought its existence, as originally constituted, to a close, the fruit-growers of this province are indebted in no small way, for their well established position, to the broad policies laid down and successfully carried out by the old Board of Horticulture.

The Order in Council passed on the 10th of March creates a new department in horticultural matters. The new board, instead of being selected from fruit-growers, is composed entirely of Departmental officials with whom the chief representative of the Dominion Entomological Branch of British Columbia is associated.

The following is the personnel of the Board:—

Dr. D. Warnock, O.B.E., M.R.C., V.S. Deputy Minister.

Provincial Horticulturist (vacant).

E. W. White, B.S.A., Asst. Horticulturist (for the Lower Mainland and Vancouver Island).

J. W. Eastham, B. Sc., Plant Pathologist.

W. H. Lyne, Prov. Inspector of Imported Fruit and Nursery Stock

R. C. Treherne, B.S.A., Field Officer, Dominion Entomological Branch.

PATRIOTIC AND RELIEF WORK OF WOMEN'S INSTITUTES

BY MRS. V. S. MACLACHLAN, SECRETARY, ADVISORY BOARD OF WOMEN'S INSTITUTES

DURING the first two years of the war no complete records were kept of the accomplishments of the women's institutes in British Columbia. During 1917 the amount of money raised and articles

made and contributed were \$16,824.07, socks, 6,404 pairs, garments, 21,000.

Last year \$15,137.93 in cash was contributed besides socks, 5,632 pairs, garments, 12,495; parcels, 2,072.

"I warn my countrymen that the great progress made in city life is not a full measure of our civilization, for our civilization rests at bottom on the wholesomeness, the attractiveness and completeness of life in the country."

Late Theodore Roosevelt.

PART III

Junior Agriculture

DEMONSTRATIONS, COMPETITIONS, AND CLASS-ROOM STUDIES IN RURAL LIFE FOR BOYS AND GIRLS

SUMMER SCHOOLS

THE TEACHERS' COURSE

SUMMER schools for teachers, for school inspectors, and in some instances for rural ministers, will be held in several of the provinces during the school vacation period. The schools for teachers and school inspectors are calculated chiefly to qualify those who attend, to carry on and promote the work of agricultural instruction in the schools. The schools provide courses of study and recreation and are in a general way uniform throughout

Canada. The course provided for the New Brunswick school, and described in the May Agricultural Gazette page 486, represents the work taken up at the several schools.

The courses for rural ministers are designed to give instruction and inspiration to the rural ministers and all those interested in country life who may devote part of their time and energy to the development of the rural community.

NOVA SCOTIA

The summer course at the Rural Science Training School, Truro, began this year on July 9th and will end on August 7th. The teaching staff comprises the several science teachers of the Provincial Normal School and the Agricultural College, and the laboratory and equipment of the two provincial institutions at Truro which are at the disposal of

both faculty and students. Tuition is free and minimum travelling expenses are refunded to successful teachers completing the full term. Teachers who satisfactorily complete four subjects may earn a bonus of about \$15 in addition. The rural science diploma is granted to teachers who successfully complete the prescribed work of the two terms.

ONTARIO

In Ontario the following agricultural courses are provided by the Department of Education in co-operation with the Ontario Agricultural College at Guelph:—(a) elementary agriculture and horticulture; applicants holding professional

certificates qualifying them to teach in the schools of the Ontario provincial system may be admitted to this course. (b) intermediate in-agriculture; to this course may be admitted public and separate school inspectors, normal school masters,

and other applicants holding professional certificates qualifying them to teach in high or continuation schools and whose academic preparation has included a competent knowledge of science. (c) Specialist in agriculture; teachers holding specialist's certificate in science are eligible to take up work in this course. (d) Farm mechanics; applicants who hold or are in course of preparation for an intermediate certificate in agriculture may be admitted to the course in farm mechanics.

The classes in agriculture have grown so large that it has been necessary to provide for a number of the students of Part I, Elementary at the Ontario Ladies College, Whitby. This applies chiefly to teachers residing or teaching east of Toronto. Men students cannot be admitted to residence owing to lack of accommodation. The instruction in agriculture is given by the regular professors, lecturers, and demonstrators of the Ontario Agricultural College.

MANITOBA

The summer school for teachers at the Manitoba Agricultural College opens on July 7 and will continue for four weeks. Its purpose is two-fold. (1) It aims to give qualified teachers an opportunity of preparing themselves to carry out the modernized curriculum. (2) It aims to make possible the better teaching of what might be called "old fashioned subjects".

All work is carried on at the College with the exception of the special course for teachers in non-English communities. This course, directed by Mr. W. J. Sissler, is conducted at the Strathcona School where practice classes are provided.

The Department of Education will pay student's return railway fare. All students are accommodated in the College residence at a flat rate of \$5 per week.

SASKATCHEWAN

Two groups of courses in agriculture, one for teachers, the other for candidates for university degree, are offered at the University of Saskatchewan at Saskatoon. The teachers' course which began July 2 will end August 9 and is intended to assist those who wish to improve their standing in the profession.

In two summer sessions of six weeks each the prescribed instruction

in agricultural science is covered and the teachers who successfully compete receive a special certificate from the Department of Education. Credit is allowed for work taken elsewhere than in Saskatchewan. Accommodation for men and women is provided at the University at \$35 for the whole period of the course.

BRITISH COLUMBIA

Summer school courses held in British Columbia in 1914, 1915, and 1917 were so well attended and so successful that the Department of Education has every confidence in the course now being held at Victoria, open to teachers of the province.

Two courses in rural science are offered. (a) A preliminary course; (b) An advanced course open to teachers who have completed the preliminary courses formerly held, or to those deemed as having an equivalent standing. Courses in

rural science include elementary studies in the various branches of agriculture as well as nature study, and school, and home-gardening. The work is being taken up by professors of the University of British

Columbia, district supervisors of agricultural instruction, Normal teachers, and other officials of the Dominion and Provincial Departments of Agriculture.

THE RURAL MINISTERS' COURSE

MACDONALD COLLEGE, QUEBEC

The summer school for rural improvement for country clergymen and others interested in rural welfare will be held at Ste. Anne de Bellevue, August 5 to August 14, 1919, under the joint direction of Macdonald College and the theological colleges of Montreal. The course is intended to give instruction and inspiration to the rural minister and all those interested in country life.

It is arranged to give instruction upon the essential problems of rural communities, both sociological and economical, and to give elementary instruction in those branches of agriculture that are most needed by the country minister. The teaching staff will include the professors of Macdonald College and theological teachers of various Canadian and American colleges.

ONTARIO AGRICULTURAL COLLEGE

A school for rural teachers and all others interested in the social, religious, economic and educational welfare of rural Ontario is held at the College, Guelph, July 21st to August 1st for the purpose of inspiration, exchange of ideas, conference and co-ordination of different agencies at work in the country. The topics include; community centres and their programmes, farm management, landscape gardening and home beautifying, the rural church as a co-operative organization, recreation and

health, rural church problems etc. Instruction in athletics and games is given every afternoon from three to eight. The speakers and leaders are Ernest Burnham, Ph.D., Michigan; John Bradford, Montreal; Henry Israel, New York; Dr. J. M. Artman, Chicago; Major Fred Smith, Toronto; Hon. Geo. S. Henry, Toronto; Dr. H. J. Cody, Toronto; Dr. Oswald Withrow, Toronto; T. H. R. Ottawa; J. B. Spencer, Ottawa; G. C. Creelman, Guelph.

MANITOBA AGRICULTURAL COLLEGE

The rural ministers' course at the Manitoba Agricultural College will open on July 28 and will continue until August 9. The principal speakers at this course will include Dr. George Albert Coe of the Union Seminary, New York; Professor Hetherington, Wesley College, Winnipeg; Professor O. H. Benson of Washington, D.C.; President Reynolds, Manitoba Agricultural College,

and Professor V. W. Jackson. Recreation and organized outdoor games form an important part of the summer school programme. A number of illustrated lectures will be given in the evenings during the term. The rural ministers' course is open to all ministers, their wives, and all community leaders, teachers, and officers.

SCHOOL AGRICULTURE

EMPLOYMENT OF THE AGRICULTURAL INSTRUCTION GRANT TO ASSIST SCHOOL AGRICULTURE

PRINCE EDWARD ISLAND

FROM OFFICE OF THE AGRICULTURAL INSTRUCTION ACT, OTTAWA

NATURE study, including elementary agriculture, is a compulsory subject in the schools of the province of Prince Edward Island. The work is associated with school or home gardens, pig and poultry clubs, and school fairs, and is under the general supervision of a Director of Rural Science. The amount allotted to these activities from *The Agricultural Instruction Act* grant is \$11,500 annually, which is expended as follows:

1. Salary and expenses of the Director of Rural Science and assistant. Salaries of four additional school inspectors.

(2) Maintenance of the Rural Science Department of Prince of Wales College for the training of teachers and for junior extension work.

(3) Bonuses to teachers for teaching agriculture.

RURAL SCIENCE DEPARTMENT

The Rural Science Department of Prince of Wales College, was entirely

equipped and is being maintained from the grant. It provides instruction in elementary agriculture for first and second year and normal-class students and supplies the training in agriculture necessary to those who are to teach the subject in the schools. The department is in charge of a Director of Rural Science, who supervises school agriculture generally, being assisted by the school inspection staff of eight inspectors, four of whom are paid from the grant. The junior extension work of the department includes boys' and girls' pig, and poultry clubs and school fairs. Materials and supplies for work of this kind, including eggs and seeds, are distributed to the schools. A rural science circular is issued.

Grants or bonuses are paid to teachers for elementary agriculture, the amount depending upon the standard of the work performed and the qualifications of the teacher.

NOVA SCOTIA

SCHOOL agriculture is not compulsory either in its rudimentary or in its more advanced form in the schools of Nova Scotia. Under the designation of rural science, its teaching is encouraged by a director, and the expense of the work is borne by *The Agricultural Instruction Act*, which allots twelve thousand dollars annually to this object. Household science and manual training are now taught in a small way by the travelling teachers.

The grant is employed for the following purposes:—

(1) For the payment of the salary and travelling expenses of the Director of Rural

Science; of his assistant; of the travelling teachers of rural science; and of the Dean of the Rural Science Faculty.

(2) For the conduct of schools for the training of teachers in rural science, including scholarships and travelling allowances.

(3) For grants to teachers for conducting school gardens and school exhibits.

TRAVELLING TEACHERS

Rural science is taught both by regular teachers and by special itinerant teachers of the subject. Each of the latter travels over a limited circuit of about a dozen schools. Of the 1,700 schools of the province, there are some 125 schools in which rural science is taught more or less

comprehensively. In about 85 of these, the work is conducted by the travelling teachers. In the remainder, this work is done by the regular teachers.

TRAINING OF TEACHERS

A training school in rural science is held twice a year at Truro to qualify teachers to deal with the subject in the common schools. The work is conducted by the Director and the Dean of Rural Science, assisted by members of the staff of the provincial Normal College and of the Agricultural College. Students are allowed actual travelling expenses, and bonuses or "scholarships" are awarded according to the quality of the

work done. The full course qualifies the teacher for a rural science diploma. In the meantime he may qualify for a special grant at each successive stage of the course.

Special arrangements are made whereby Normal students may supplement their agricultural studies by attending the rural science schools, and thus qualify for the diploma.

GARDEN AND EXHIBITION WORK

Teachers who do noteworthy work in connection with gardening or exhibitions are granted bonuses varying from \$5 to \$25. Otherwise, no provision is made for increasing the remuneration of those teaching rural science.

NEW BRUNSWICK

ACCORDING to the course of instruction for the New Brunswick schools, nature study and agriculture is a prescribed subject for all schools. Only in schools, however, whose teachers are qualified by attendance at the rural science school where experimental instruction and practical school gardening are carried on, are funds from *The Agricultural Instruction Act* used. In other schools formal abstract methods chiefly are employed.

The allotment of \$14,800 to elementary agriculture is expended as follows:--

(1) Salary and expenses of Director of Elementary Agricultural Education and of his assistant.

(2) Teacher training.—Expenses connected with the conduct of rural science schools and Teachers' Winter Short Course.

(3) Grants to teachers and trustees for agricultural teaching, subject to the regulations of the Board of Education.

(4) Expenses connected with school and home gardens and school fairs.

(5) Printing reports and bulletins, including a monthly leaflet devoted to the promotion of rural education.

TEACHER TRAINING

In order to qualify teachers to give instruction in elementary agriculture,

a rural science school is held each summer at Sussex, lasting for four weeks. This is supplemented by a Teachers' Winter Short Course. A full course requires two summer sessions and leads to a certificate. Teachers are paid their travelling expenses.

A teacher who attends the rural science school and who, during the first year subsequent to attendance, carried on in his or her school, agricultural instruction and school gardening, is entitled to a bonus of \$20, provided the instruction given is in accordance with the methods followed at the rural science school, and has the approval and support of the district and school trustees.

GRANTS TO TEACHERS AND TRUSTEES

Any board of school trustees that provides the prescribed instruction in elementary agriculture and school gardening may receive a grant equal to the amount expended by the board on equipment and apparatus up to the sum of fifty dollars for the first year, and of thirty dollars for the second and subsequent years.

Teachers giving instruction in nature study and agriculture in the common schools receive a grant of \$30 each, if they have attended the rural science school for one session, and of \$50 if they have been granted a rural science certificate. The regulations require that, in addition to formal instruction, a school garden shall be adequately maintained by the pupils.

In most of the schools, home gardens and poultry projects are carried on, all leading to the school fair.

No grants have hitherto been made to high schools for agricultural instruction. Nevertheless, many of the high school teachers have taken the rural science school course, and co-operate with the teachers in the lower grades in this connection.

The Director of Elementary Agricultural Education is connected with the Department of Agriculture. His division conducts the extension work in agriculture, acting in co-operation with the Board of Education.

ONTARIO

A PORTION of *The Agricultural Instruction Act* grant to the province of Ontario is allotted each year to elementary agricultural education, or school agriculture, to be disbursed by the Department of Education. The moneys thus derived, amounting to \$40,000 annually, are employed for the following purposes, namely:

(1) For the training of teachers in agriculture and horticulture, in farm mechanics, and in household science.

(2) For the payment of grants, (a) to boards of primary schools for the purpose of equipment for instruction in agriculture and horticulture; (b) to teachers in primary schools for the management of home and school gardens, and (c) to inspectors for special work connected with such teaching.

(3) For the payment of grants to boards of secondary schools for the purchase of equipment for instruction in agriculture, and for grants to teachers in such schools for work performed in teaching the subject.

(4) For the payment of grants to (a) the boards of rural and village schools, and, (b) to teachers, for instruction in manual training and household science.

(5) For the payment of the salary and travelling expenses of (a) the director of elementary agricultural education; (b) for the salary of the teacher of household science; (c) for a part of the salary of the inspector of household science and farm mechanics.

1. TRAINING OF TEACHERS

(a) *In Agriculture, Horticulture and Farm Mechanics.*

For the training of teachers, summer courses are provided at the Ontario Agricultural College and else-

where in agriculture, horticulture and farm mechanics.

The course for public and separate school teachers leads to a certificate in elementary agriculture and horticulture; the course for teachers in secondary schools is confined to those already qualified to teach science in high schools, and leads to the intermediate certificate in agriculture; the course in farm mechanics is provided for teachers who are qualifying to teach agriculture in the high schools and leads to a farm mechanics' certificate.

The expenses of students attending these courses are refunded and charged to *The Agricultural Instruction Act*.

(b) *In Household Science.*

Summer courses and examinations for certificates in elementary household science are taken at the Household Science Department of the University of Toronto. These certificates are valid in rural or village schools. The cost of these courses to the University is met from *The Agricultural Instruction Act* grant.

Agricultural Teaching in Primary and Secondary Schools.

In order to encourage in the schools of the provincial system the teaching of agriculture and horti-

culture, household science and manual training, special grants are offered to school boards and teachers as follows:

2. AGRICULTURE AND HORTICULTURE IN PRIMARY SCHOOLS

For instruction in agriculture and horticulture in rural ungraded schools and in rural or urban graded schools, the payment is authorized of grants to boards and to teachers, the amount depending on the class of certificate held by the teacher and the scope of the plan adopted.

The grants are made subject to the requirements of the Department's regulations, which call for—

- (a) Class teaching for not less than one hour per week throughout the school year;
- (b) School or home garden or projects;
- (c) The improvement of school grounds;
- (d) The transmission of regular reports on the work to the Department of Education.

Inspectors' Allowances.

To encourage inspectors to pay special attention to the teaching of agriculture in the primary school, and to report upon the work, the payment to inspectors is authorized of an allowance of eight dollars for each school taught by a teacher who holds a certificate in agriculture, and of six dollars for each school where classes in agriculture are under the charge of a second-class teacher.

3. AGRICULTURE AND HORTICULTURE IN SECONDARY SCHOOLS

To promote the teaching of agriculture in high and continuation schools, annual grants are authorized to boards, subject to the departmental regulations, for the purchase of equipment, and to teachers for conducting the work, as follows:—

A maximum allowance of \$100 to boards for an agricultural course in the lower school and of \$100 for an agricultural course in the middle school.

An annual grant to teachers varying from \$80 to \$120, according to the grade of certificate and other qualifications, and the amount of teaching performed.

4. MANUAL TRAINING AND HOUSEHOLD SCIENCE

Special provision is made for assisting manual training and household science in rural and village schools. A school of this description, which provides suitable accommodation and equipment and maintains classes in manual training as applied to work on the farm, or in household science suitable to the requirements of rural districts, is entitled, subject to the regulations, to an initial and a subsequent grant, to be expended on accommodation, equipment and supplies, the total grant not to exceed the total expenditure of the board for the year in connection with these classes. The amount of the grant to the teacher in such a school depends upon the class of certificate held.

When a school taking up household science provides at least one hot dish for pupils' lunch, an additional grant of \$10 to the teacher is authorized.

MANITOBA

IN Manitoba about \$30,000 is spent on school agriculture, \$11,000 of this is funds provided under *The Agricultural Instruction Act*. Four thousand dollars is provincial

funds and the balance is provided by school boards and by private subscription. This money is spent under the heading of boys' and girls' clubs, as in this way it is

believed that agriculture can be taught more effectively than in any other way.

Every new class that passes through the Normal School spends one month at the Agricultural College when all phases of boys' and girls' club work are effectively dealt with. There is close co-operation between the departments of Agriculture and Education. In October the annual inspectors' conference is held and the boys' and girls' club work of the previous year is carefully reviewed and plans formulated for the succeeding year. These plans are carefully gone over by the Extension Service, and organization plans are prepared and sent out to the teachers immediately after the Christmas holidays.

The two main features of boys' and girls' club work are educational and economic.

Use is made of the educational machinery, thus eliminating duplication of effort and misunderstanding which means that the best efforts of both departments are a unit in developing the different phases of club work.

The one-roomed rural school and the individual rooms in the town or consolidated school is made the unit in forming clubs. Usually from six to twenty-five of these units are included in one club whose head-

quarters are at the natural marketing centre of the community.

Twelve contests have been provided and these include the most important branches of agriculture and home economics. It is expected that each club member will keep a record of his contest, his labour, feed, initial expenditure, and at the end of the season write an essay on the subject, thus correlating it with the English, the arithmetic, history, etc.

It is very obvious that as agriculture is a practical subject, it must be taught in a practical way and that text books and set lessons will have the effect of deadening the interest. Hence, use must be made of the equipment, live stock, poultry, grains, etc., found on the home farm and advantage taken of the practical experience and knowledge of the parents to supplement the enthusiasm and organizing ability of the teacher.

The rules of the contest constitute the instruction in that subject and the result is that the boy or girl who is raising a calf or a pair of pigs reads many times more on the subject than he could be induced to read in a text book if he did not have a real live "sure enough" pig in order to put into practice the knowledge gained.

QUEBEC

CALF CLUBS

BY E. N. BLONDIN, B.S.A., AGRICULTURAL REPRESENTATIVE, HUNTINGDON

THREE Calf Clubs for boys have been formed in Quebec province recently with the following aims:—(1) To stimulate interest in better live stock on farms, principally among the older boys; (2) To give training in proper methods of caring for live stock, particularly the raising of dairy cattle; (3) To show the necessity of keeping records; (4) To give the boys some business training.

To the members of these clubs are offered Holstein and Ayrshire bull calves, two months old, registered and selected from the best herds in the district. The calves are drawn by the members and sold at a set price. Each boy pays cash for his purchase or gives a negotiable note endorsed by his parent or guardian.

Each member agrees to weigh his calf the day he gets it and on the first of every month. A record must be

kept of all feed fed in order that the gain, and the cost of the gain, of the calf can be determined.

The calves will be exhibited at the fall fair, and prizes will be awarded for the best animals and also for the best kept record. After the exhibition members may offer their calves for sale by auction if they wish. This

will enable those who borrowed money for the purchase a chance to pay back the borrowed sum. Each member will be allowed a reserve bid.

These clubs cover the whole territory of Huntingdon and Chateauguay counties and are open to any farm boys between 14 and 18 years of age.

ONTARIO

A DUROC JERSEY PIG CLUB

MR. J. W. NOBLE, agricultural representative in Essex county, has organized a Boys' and Girls' Pig Club. The club is under the auspices of the Essex County branch of the Ontario Department of Agriculture and the local branch of the Imperial Bank of Canada. Membership is open to boys and girls between the ages of ten and eighteen. Each member will receive two pigs about two months old, one a registered Duroc-Jersey sow and the other a grade pig. As in most of the other clubs the pigs will be paid for from the sale of the grade pig after it is fattened next fall. The sow must be kept for breeding pure-bred Duroc Jersey pigs. The pure-bred sows will cost \$20 and the grade pigs \$8 each. The children's parents must agree to furnish a suitable pen and yard and to supply the member with a sufficient quantity of suitable feed and

also one-quarter acre of pasture. The members must care for their own pigs and feed them according to the instructions of the agricultural representative. A record must be kept of the amount and kinds of feed used and the weight of each pig at the end of each month. Two competitions will be conducted and prizes awarded on the basis of

(a) 50 points for highest net profit per cwt.

(b) 25 points for condition when visited in summer.

(c) 25 points for best kept records and report.

The pigs were distributed on June 7, when each member and parent was required to receive the pigs and sign the note which will bear interest at 7 per cent. The pigs were numbered and allotted to the members according to the numbers drawn from a hat.

MANITOBA

BOYS' AND GIRLS' HOME GARDENS

THE school year in Manitoba ends on June 1, and as a large percentage of the teachers either change schools or retire from teaching at that time, there does not seem to be anyone left to look after having the gardens weeded, and with the rich Manitoba soil, weeds seem to spring up over night, and the result has been that when the school reopened, the school garden was mostly weeds.

For the past three years there has been a steady tendency towards having the school garden on the home farm, and through sympathetic co-operation between the teacher and parents, these home gardens have come through in pretty good shape, so that now the school garden work has been incorporated with that of the boy's and girls' clubs, and this work carried on by the Departments of Agriculture and Education in co-operation.

SASKATCHEWAN

GOPHER COMPETITION

M. P. TULLIS, WEED AND SEED COMMISSIONER

SASKATCHEWAN school children this year destroyed 1,326,092 gophers according to reports received from the teachers of 1,214 schools, at the close of the contest, which ended Gopher Day, May 24th.

In 1917, 550,000 gophers were accounted for by about 800 schools, while in 1918, 880,000 tails were obtained by the children of approx-

imately 1,000 schools entered. Thus in the three years during which the Junior Agricultural Service League has waged war on the gopher over 2,000,000 have been caught in the spring before the young broods appeared. These early gophers are each worth three or four later in the year. Saskatchewan children have shown themselves to be truly worthy members of the league.

ALBERTA

OUTDOOR LABORATORY EXPERIMENTS

BY FREDERICK S. CARR, VICTORIA HIGH SCHOOL, EDMONTON

LABORATORY experiments with plants are carried along three different lines at the Victoria High School, Edmonton.

1. *Information.*—The students are city bred and in many cases are not acquainted with even common grains and legumes. The common farm and garden plants are grown in the garden and studied both in the field and indoors in the winter.

2. *The Influence of Cultural Conditions.*

3. *Plant Experimentation.*—It was felt that in an academic high school, effort had to be conserved to be directed along one line that would show results. With this in view it was decided to use the potato. This plant offered many advantages—its familiarity, its plasticity, and ease of harvesting and storing. Table Talk, one of the approved varieties for the district, was selected. The first planting was made in 1915 from ordinary seed selected at random from the bin. At the end of each season, when the crop was lifted, a

standard was decided on by which seed for the following season was selected. The standard was set by a certain number of marketable potatoes in the hill.

	1915	1916	1917	1918
Yield in bushels per acre.	133½	250	333½	318
Standard—number of marketable potatoes per hill	30	24	24	20

The season of 1918 had a very severe frost in July, followed by lighter frosts in August, hence the decrease in yield

In addition, the Domestic Science Department is supplied with a large proportion of its vegetables, a by-product of the laboratory activity. This use of the products also helps to fix in the mind of the student the interdependence of the various departments and subjects of study in his school work.

PART IV

Special Contributions, Reports of Agricultural Organizations, Publications, and Notes.

BOYS' AND GIRLS' COMPETITIONS

THE prize lists of a number of the larger exhibitions in Western Canada announce attractive competitions open to boys and girls. These competitions are a means of stimulating the interest of the youth of rural Canada in their work and directing their efforts toward higher efficiency.

MANITOBA WINTER FAIR AND FAT STOCK SHOW

One thousand dollars divided into twenty prizes of from \$100 to \$25 will be awarded in this competition by the Winnipeg section of the Canadian Bankers' Association and the Department of Agriculture. The competition will be held at the Manitoba Winter Fair and Fat Stock Show in March, 1920. This contest is open to Canadian boys between 9 and 17 years of age, and to steers and heifers calved in 1919. The competitor must have fed, cared for, and fitted his animal for at least four months immediately previous to date of the exhibition and must himself exhibit the animal in the show ring when judged or paraded.

CONTINUATION CLASS

The continuation class is open to boys who had entries in previous boys' calf competitions of 1917 and 1918 and to steers calved in 1918.

In addition to the attractive cash prizes offered, the Manitoba Agricultural College will give to the winners of 1st, 2nd, and 3rd places one year's tuition free of charge at the Agricultural College. Now is the time to select the animals and prepare for these competitions.

SASKATOON INDUSTRIAL EXHIBITION

A Competition open to teams consisting of three *bona fide* farm boys between twelve and eighteen years of age is held at the Saskatchewan exhibition. Prizes offered for teams scoring the highest average in judging draft horses, beef cattle, dairy cattle, sheep and swine are: 1st, \$100; 2nd, \$90; 3rd, \$80; 4th, \$70; 5th, \$60; 6th, \$50; 7th, \$40; 8th, \$30; 9th, \$20; 10th, \$10; 11th, \$10; 12th, \$10; 13th, \$10; 14th, \$10; 15th, \$10. In addition, individual prizes amounting to \$50 are donated, and a gold watch valued at \$50 will be won by the individual boy making the highest average in judging in this contest.

Free admittance to the exhibition grounds is given each boy making entry in this competition. Free sleeping accommodation is provided by the Exhibition Board. Lectures and demonstrations are conducted by the College of Agriculture for the benefit of the boys during the days of the competition.

REGINA PROVINCIAL EXHIBITION

At the Provincial Exhibition at Regina competitions in live stock and poultry are open to boys and girls from 14 to 17 years of age. Exhibitors must have fed, cared for, and fitted their exhibits continuously since June 1st, 1919, but the exhibit may be the property of parent or guardian. In addition to \$228 in cash prizes there are two medals, a silver and a bronze, offered by the Regina branch of the Canadian Bank of Commerce. Competition for these medals is open only to exhibitors showing animals bred and raised in the province of Saskatchewan.

SWIFT CURRENT EXHIBITION

A feature of the exhibition held at Swift Current, Saskatchewan, this year was the boys' calf breeding competition, held under the auspices of the agricultural society. Prizes of \$15, \$10, and \$5 were offered for steers or heifers born after January

1st, 1918, exhibited by boys from eight to fifteen years of age who had raised, fed, and handled the animals during their life time.

EDMONTON EXHIBITION

The Edmonton Exhibition Association has this year continued the classes for boys and girls exclusively. The Pig Growing contest is open to girls and boys from nine to seventeen years. In addition to \$155 in cash prizes a special \$100 silver challenge cup is donated by the Hudson Bay Company of Edmonton. A miniature of this cup is presented yearly to the winner and the large trophy can be won permanently in two successive years or any three years.

In vegetables and horticulture there are twelve classes for children with an aggregate prize list of \$79. In school-work competitions the cash prizes amount to \$776.50. Besides these there are a number of other classes in which boys and girls may compete.

ASSOCIATIONS AND SOCIETIES

EVENTS OF THE COMING MONTHS

June 28 to July 5	—Calgary Exhibition, Calgary, Alta. Secretary, E. L. Richardson, Calgary, Alta.	July 21 to 26	—Interprovincial Fair, Brandon, Man. Secretary, W. I. Smale, Brandon, Man.
July 7 to 12	—Edmonton Exhibition, Edmonton, Alta. Secretary, W. J. Stark, Box 216, Edmonton, Alta.	July 28 to Aug. 2	—Regina Exhibition, Regina, Sask. Secretary, D. T. Elderkin, Regina, Sask.
July 14 to 19	—Industrial Exhibition, Saskatoon, Sask. Secretary, C. D. Fisher, Saskatoon, Sask.	August 4 to 6	—Western Canada Irrigation Association Convention will be held at Medicine Hat, Alta. Acting Secretary, James Colley, Box 1317, Calgary, A. a.

THE ONTARIO POULTRY CONFERENCE

A large number of poultrymen and delegates from various poultry associations in the province met at the Ontario Agricultural College, Guelph, on June 10, 11, and 12, to discuss topics pertaining to the poultry industry. The reports of various associations were received and discussions followed. This body of poultrymen, representative of Ontario poultry associations, strongly en-

dorsed the proposed Record of Performance for poultry and suggested that it be made federal in its scope; a permanent Ontario poultry confederation was recommended and it was requested that the provincial Department of Agriculture furnish the funds necessary to establish an egg-laying contest, equipment to be provided and ready for operation in the fall of 1920.

INTERNATIONAL HOG FEEDING CONTEST FOR BOYS AND GIRLS

The International Live Stock Exposition will hold at their show to be held in the Union Stock Yards, Chicago, on November 29th to December 6th, 1919, a contest for pens of three barrows under twelve months, fed by a boy or girl from ten to nineteen years of age. The feeding period starts August 1st. The following prizes are offered:—1st prize, \$50; 2nd prize, \$40; 3rd prize, \$30; 4th prize, \$20; 5th prize, \$10.

CONDITIONS

1. All entries to be made in the name and by the feeder and filed with International as soon as possible after date when feeding period begins. Contestants are limited to

two entries in this division. Exhibitors will be required to personally select and care for their animals without the aid of an assistant.

2. Within thirty days after feeding period begins, the animals must be weighed and an accurate record of feeding kept thereafter.

3. In judging, quality and finish will count 50 per cent; gain 20 per cent; cost of gain 20 per cent; and records kept and written reports 10 per cent.

4. Notice of intention to enter one or more of these feeding contests to be mailed to B. H. Heide, Secretary, International Live Stock Exposition, Union Stock Yards, Chicago, at the beginning of the period, who will, upon receipt of notification, mail formal entry blanks. No entrance fee will be charged.

WESTERN CANADA IRRIGATION ASSOCIATION

The Western Canada Irrigation Association will hold its convention this year at Medicine Hat on August 4th, 5th, and 6th. Papers will be read dealing with the practical problems of irrigation covering such topics as, commercial seed growing, profitable crops with irrigation in Southern Alberta, live stock on the irrigated farm, the eco-

nomie phases of irrigation, and other matters of interest to irrigation farmers.

The increasingly important place which irrigation occupies in agriculture in western Canada is reflected in the work of the association and this year's convention is expected to be of increased value to practical irrigationists throughout the country.

**ALBERTA CATTLE BREEDERS' ASSOCIATION
LACOMBE BULL SALE**

The tenth annual auction sale of pure bred bulls held by the Alberta Cattle Breeders' Association at Lacombe took place on May 27th and 28th. One hundred and twenty-seven bulls were sold for \$28,985 making a general average of \$228.22. The highest price of \$625 was made for the Hereford bull, Willow Springs Atkins—29,450. The following table shows the number of

animals of each breed and the total and average price secured:—

	Total	Average
59 Herefords	\$12,900	\$218 64
1 Red Poll	125	125 00
55 Shorthorns	13,155	239.18
12 Aberdeen-Angus	2,805	229 08
127 All breeds	28,985	228.22

NEW PUBLICATIONS

FEDERAL DEPARTMENT OF AGRICULTURE

EXPERIMENTAL FARMS

Bulletin 92, The Strawberry and its Cultivation in Canada, by W. T. Macoun, Dominion Horticulturist, is a revision of Bulletin 62, "Strawberry Culture," issued in 1909. To add to the completeness of this bulletin, sections on insects affecting the strawberry, by the Entomological Branch and common strawberry diseases by W. A. McCubbin of the Division of Botany have been added.

HEALTH OF ANIMALS BRANCH

The Report of the Veterinary Director General for the year ending March 31, 1918—contains a full report of the contagious diseases of animals in Canada, and information on the inspection of meat, condensed milk, and vegetables.

PROVINCIAL DEPARTMENTS OF AGRICULTURE

NOVA SCOTIA

Proceedings of the Entomological Society for 1918 issued by the Department of Agriculture for Nova Scotia, contains the report of the fourth annual meeting of the Society held at Truro with the names of newly elected officers, and gives in full the papers read at the various sessions of this meeting.

QUEBEC

The following circulars by C. A. Fontaine B.A., B.S.A., have been published by the Department of Agriculture of the province of Quebec. They give briefly the history, uses, description, and place in rotation of the crops, along with directions for preparing soil, seeding, harvesting, etc.: Circular No. 25—Corn Culture; Circular No. 28—Wheat Culture; Circular No. 29—Rye Culture; Circular No. 30—Barley Culture; Circular No. 31—Oat Culture; Circular No. 32—Flax Culture; Circular No. 35—Pea Culture; Circular No. 37—Potato Culture. Circular No. 38 is a spray calendar prepared by Georges Maheux, Provincial Entomologist for Quebec.

Bulletin No. 25.—A Short Study on Cereals, by F. N. Savoie, B.S.A., published by the Department of Agriculture of the province of Quebec, gives a brief account of the cereals grown in the province along with essential points on the botany of these plants.

Quebec Pomological and Fruit Growing Association.—The annual report for 1918 contains a review of the summer meeting held at Berthierville on the 9th and 10th of September and of the annual meeting held

at Ste. Anne de Bellevue on the 11th and 12th of December.

The Quebec Dairymen's Association.—The thirty-seventh report of the Dairymen's Association and the Quebec Dairy School contains the proceedings of the Quebec Dairymen's convention held at Valleyfield on the 24th December, at which many addresses on various phases of dairying were delivered.

Agricultural, Horticultural and Co-operative Societies.—Bulletin No. 45 of the Quebec Department of Agriculture contains a list of the presidents and secretaries of agricultural societies, agricultural circles, horticultural societies, co-operative associations, and syndicates of horse breeders with their addresses.

Bulletin No. 64, Seed Treatment, by Georges Maheux, Provincial Entomologist for Quebec province, deals with diseases of cereals and potatoes and outlines methods of treating same.

ONTARIO

The Report of the Inspector of Agricultural Classes.—This annual report for the province of Ontario for the year 1918 contains much valuable information regarding agricultural teaching in the schools of the province.

Report of the Vegetable Growers' Association.—The fourteenth annual report of the Vegetable Growers' Association, which is for the year 1918, constitutes a report of the annual convention held in Toronto in January, 1919.

Report of the Ontario Agricultural College and Experimental Farm.—The forty-fourth annual report of the Ontario Agricultural College and Experimental Farm reviews the work of the various departments of the college and such extension operations as farm surveys and drainage surveys.

Horticultural Societies.—The annual report of the Horticultural Societies of Ontario for 1918 contains the addresses delivered, the discussions that occurred, and the business transacted at the convention held in Toronto in February.

SASKATCHEWAN

Plows and Plowing, by Professor J. MacGregor-Smith, University of Saskatchewan, gives a comprehensive treatment of the subject of plowing and in detail treats of all the various kinds of plows and their different parts. By the use of numerous diagrams and illustrations facts are well brought out.

Circular No. 19—Potato Growing in Saskatchewan—by John Bracken, Professor of Field

Husbandry, University of Saskatchewan, gives detailed information regarding the growing of potatoes in that province.

Domestic Science Circular No. 1—Good Recipes for Country Use—by Mrs. Jean Archibald, issued by the Department of Agriculture of the province of Saskatchewan, gives a number of recipes of practical value to the country housewife.

Bulletin No. 57—Weeds, Their Identification and Control, by M. P. Tullis, Weeds and Seed Commissioner. In this publication prominence is given to weed of a highly noxious nature, with descriptions and methods of prevention and control. It also includes the Noxious Weeds Act and regulations under the same.

"*Better Belt Lacing*,"—"Knotter Troubles"—"*Rope Knots and Hitches*"—are three pamphlets by J. MacGregor Smith, B.S.A., Professor of Agricultural Engineering, College of Agriculture, University of Saskatchewan, issued by the Department of Agriculture of the province. In these three pamphlets

much valuable information and many useful hints of farm mechanics are given.

Home Beautification, issued by the Department of Agriculture gives suggestions for home planting, along with various shrubs and plants suitable for the Prairies.

BRITISH COLUMBIA

Bulletin No. 27—Climate of British Columbia, compiled by Mr. F. Napier Denison, Superintendent of the Gonzales Heights Observatory, and issued by the Department of Agriculture, contains climatic reports from various districts of the province and gives accurate information respecting the temperature, precipitation and sunshine during the years of 1916, 1917, and 1918.

MISCELLANEOUS

Canadian Shorthorn Annual, 1918, published by the Dominion Shorthorn Breeders' Association, contains a report of the work for 1918, along with the proceedings of the thirty-fourth annual meeting held in Toronto.

NOTES

A new women's institute and community hall has recently been opened at South Gillies, Ont.

A motion picture film dealing with the handling of milk, tracing it from the farm to the city, is being shown by the Saskatchewan Bureau of Public Health.

To cope with the plague of grasshoppers that has broken out in certain limited areas in the south-western part of the province of Manitoba, the provincial department of agriculture has distributed Paris green free to farmers in the infested areas.

Miss Olive Hayes has been appointed to the Superintendency of the Women's Institutes in British Columbia. Miss Hayes is a graduate of Macdonald Institute, Guelph, and was for a time a demonstrator and lecturer with the women's institutes in Ontario.

A Wellington County, Ontario, agricultural representative reports that from four rows of turnip seed grown last year, a farmer harvested about one hundred pounds of seed, which he sold at about ninety cents per pound. Twenty farmers purchased their supplies of seed from this stock.

The Soldier Settlement Board of Canada has made an arrangement with the Ontario

Department of Agriculture whereby forty-seven representatives of the Department will act as county agents of the Board. These representatives will assist in placing settlers with farmers for training and also will assist with the supervision of the settlers when they are established on their own farms.

A shower of shrubs, bulbs, and flower seeds was a special feature of the Arbor Day celebration at School Section No. 12, Mountain, Dundas Co., Ont. The ratepayers of the section attended the exercises which, besides the improving of the school grounds with shrubs and plants, included a programme of songs and recitations by the pupils as well as addresses by adults. This rather unique celebration of the day should prove a very valuable feature in Arbor Day activities of other school sections.

Mrs. Jean Muldrew, a leading educationist, lately director of Household Economy for the Canada Food Board, has been appointed Director of the Home Branch of the Soldiers' Settlement Board. Mrs. Muldrew trained as a specialist in household science at Macdonald Institute, Guelph. She was for a time House Mother at Macdonald College, Ste. Anne's, Que., and later was Principal of Red Deer Ladies' College, Alta. In connection with her new work Mrs. Muldrew plans a campaign for the improvement of home conditions on the farm.

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- June 28.
Poultry Problems. George Robertson, Assistant to Dominion Poultry Husbandman, Ottawa, page 2.
How to Preserve Quality in Eggs. M. A. Jull, Manager and Lecturer, Poultry Department, Macdonald College, page 5.
- The Canadian Entomologist*, Toronto, Ont., June and July.
Notes on the Canadian Representatives of British Species of Bees. F. W. L. Sladen, Apriarist, Dominion Experimental Farms. Page 124.
- The Canadian Farm*, Toronto, Ont., July 9.
The Tragedy of the Vanished and Vanishing Birds. P. A. Taverner, Ornithologist to the Geological Survey. Page 5.
- The Canadian Horticulturist and Beekeeper*, Peterboro, Ont.
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Cover Crops in the Orchard. W. S. Blair, Superintendent, Experimental Station, Kentville, N.S., page 162.
- The Canadian Poultry Review*, Toronto, Ont., July.
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- The Canadian Thresherman and Farmer*, Winnipeg, Man.
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- Farm and Home*, Vancouver, B.C. June 5.
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- July 3.
Some Diseases of Small Fruits and Vegetables. J. W. Eastham, B.Sc., Provincial Plant Pathologist. Page 11.
- Farmer's Advocate and Home Magazine*, London, Ont, May 29.
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- June 5.
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The Conservation of Agricultural Experience. J. McCaig, Chief Publicity Branch, Department of Agriculture, Edmonton. Page 674.
The Evolution of Agriculture. J. McCaig. Page 696.
- Farmers' Magazine*, Toronto, Ont.
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What is the Ideal Tractor? Professor L. J. Smith, Manitoba Agricultural College, page 13.
Making the Farm Tractor Pay. L. C. Heimpel, Physics Department, Ontario Agricultural College, Guelph, page 38.
- Littlebury's Magazine*, Calgary, Alta.
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What the Community Owes to Agricultural Societies. E. J. Fream, Secretary of the Alberta Agricultural Fairs Association, page 1.
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- The Maritime Farmer and Co-operative Dairyman*, Sussex, N.B.
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The Milking Machine. Geo. W. Muir, B.S.A., Assistant to Dominion Animal Husbandman, Ottawa, page 944.
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Pointers at Shearing Time. Angus McMillan, Manitoba Agricultural College, page 758.
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PART V

The International Institute of Agriculture

FOREIGN AGRICULTURAL INTELLIGENCE

All communications in regard to this section should be addressed to T. K. Doherty, International Institute Commissioner, Department of Agriculture, West Block, Ottawa.

SCIENCE AND PRACTICE OF AGRICULTURE

GENERAL INFORMATION.

- 3—**The Migration of Mosquitos.**—HEADLEE, T. J., in the *Scientific American Supplement*, pp. 214-215. New York, April 6, 1918.

The problem of the destruction of the mosquitos in a given locality is complicated by the fact that the insects migrate, often over long distances. Entomologists who have studied the question have found that certain species of *Anopheles* can travel as far as 60 miles (observations of MITCHELL in 1879 and 1886 and YOUNG in 1909, etc.). The species that fly farthest are usually those that lay their eggs on salt marshes.

The cause of mosquito migrations is obscure, but it can be assumed that they are due to the need of finding more abundant food when a species breeds very intensely upon a large area. LEPRINCE and ORENSTEIN have shown at Panama that swarms of *Anopheles albimanus* (an important carrier of malaria) regularly flew half a mile from their ordinary habitat to a village in order to find food, returning before morning.

When swarms migrate over long distances they usually find breeding places near their food supply and rarely return to where they were bred.

Air movements, atmospheric moisture and temperature influence migrations.

The author considers that long distance flights are due to the search for food. Air currents, as long as they are not too high to prohibit movement, do not affect the short ordinary flights, while winds of low velocity appear to favour long flights.

These facts show that in the practical work of control all the species infesting a given locality must be studied for a whole summer, so as to determine which are indigenous and which visitors. The sources of the invading pests should also be found and eliminated.

- 5—**Food Chemistry in the Service of Human Nutrition.**—SHERMANN, H. C., in the *Journal of Industrial and Engineering Chemistry*,

pp. 383-390, Bibliography of 30 Publications. New York, May 1, 1918.

The author discusses in detail the question as to how adequacy of nutrition can be combined with such a use of food as to produce both financial and national economy.

An adequate diet should provide sufficient amounts of digestible organic nutrients to yield the necessary number of calories of energy. The average hourly expenditure of energy by an average man (154 pounds) under different conditions of activity is (calories):—

Sleeping, 60-70; awake, lying still, 70-85; sitting at rest, 100; standing at rest, 115; tailoring, 135; typewriting rapidly, 140; bookbinding, 170; light exercise (bicycle ergometer), 170; shoemaking, 180; walking slowly (about 2½ miles per hr.), 200; carpentry, 240; metal working, 240; industrial painting, 240; active exercise (bicycle ergometer), 290; walking actively (about 3½ miles per hr.), 300; stoneworking, 400; severe exercise (bicycle ergometer), 450; sawing wood, 480; running (about 5½ miles per hr.) 500; very severe exercise (bicycle ergometer), 600.

The daily food allowances for healthy boys should provide a quantity of energy equivalent to 900-1,200 calories for boys under 2 years, 1,200-1,500 for those from 4 to 5 years, 1,700-2,000 for those from 9 to 10 years, 2,600-3,100 for those from 14 to 15 years, 2,700-3,400 for those from 16 to 17 years. The requirements of girls are somewhat lower, especially after 8 or 9 years. The maintenance of an optimum degree of fatness (which, as SYMONDS has shown, is very near the average of healthy Americans) is usually the best evidence that the energy value of the diet is well adjusted to the needs of the individual. The estimation of the calories in the food is not necessary as a means of establishing the adequacy of the customary food intake if this is already established by the obvious condition of nutrition of the individual concerned; but if it is a question of rationing either an individual or a com-

munity then adequate energy value of the ration is the first thing that must be considered, for only when the energy supply is adequate can the tissue-building constituents of the body and of the food be conserved to the best advantage.

The author estimates the daily protein requirements of a man to be about 75 gm. The requirements of children for protein as well as other tissue-building material will be considered as proportional to their energy requirements and therefore much higher per unit of weight than in the case of adults. An adequate diet should provide a suitable quantity of ash constituents and furnish them in suitable proportions. A series of researches show that the average American dietary contains a much more liberal margin of protein than of either phosphorus or calcium, and that while the danger of a protein deficiency is rarely serious the danger of a deficiency of phosphorus or calcium is more important. Phosphorus deficiencies are plainly more frequent than are deficiencies of protein, and calcium deficiencies are more frequent still. The old assumption that adequate protein may be taken as meaning adequate supplies of all tissue-building material is found to be wholly misleading.

The iron requirement may average about 0.010 gm. and the corresponding standard be placed at 0.015 gm. per man per day. On this basis it would appear that the danger of a deficient intake of iron on freely chosen diet is less than in the case of calcium but much greater than is the danger of a deficiency of protein.

For growing children the standard allowances of these substances in grams per 100 calories may be reckoned as 2.5 gm. of protein (which should be mainly in the form of milk protein in the dietaries of growing children), 0.048 gm. of phosphorus, 0.023 gm. of calcium, and 0.0005 gm. of iron. In addition an adequate diet supplies the organism with sufficient quantities of those substances so far unidentified, i.e. food hormones or vitamins.

The vitamin requirement cannot be stated in term of actual weights of Fat-Soluble A and of Water-Soluble B, but the percentages of certain foods rich in the one or the other of these essentials which suffice to make an otherwise satisfactory diet adequate for normal growth and reproduction have been determined experimentally by OSBORNE and MENDEL and by McCOLLUM and his associates, so that the relative richness of several of the chief types of food in these dietary essentials is known in a general way, so that this factor of food value can be taken into account in considering the prominence which should be given to each type of food in planning an adequate and economical diet. It is very interesting to find how generally the types of food rich in calcium (milk, eggs, vegetables) are rich in vitamins as well, so that in safeguarding against deficiency of the element most likely

to be deficient, an ample intake of vitamins is assured.

An adequate diet should include a sufficient amount of material of such physical character as to ensure the proper handling of the food mass and its residue in the digestive tract.

Dealing with the application of these principles to the choice of food, the author says that "it seems a good general rule for families of any level of income or standard of living to spend at least as much for milk as for meat, to spend at least as much for vegetables and fruit as for meats and fish."

As regards substitutes for wheat the author adds: "To the extent that the saving of white wheat flour means an increased use of the coarser flours and of oat meal and potatoes in breadmaking (or potatoes in place of white bread) this also will result in an improvement in the mineral and vitamin content of the diet. To the extent that wheat flour is replaced by maize meal, we may anticipate no appreciable gain or loss in nutritive value."

CROPS AND CULTIVATION.

9—**Climatic Control of the Morphology and Physiology of Beets.**—SHAW, H. B., in *Sugar*, Vol. XIX, Nos. 10-12; Vol. XX, Nos. 1-4. Chicago, 1918 (3 pp. in *Institute Bulletin*).

10 **Investigations into Soil Acidity, in the United States.**—I. ALLISON, F. E., and COOK, R. C., The Effect of Ammonium Sulphate on Soil Acidity, in *Soil Science*, pp. 50-512 Baltimore, June, 1917.—II. NOYES, H. A. and YODER, L. Carbonic Acid Gas in Relation to Soil Acidity Changes, *Ibid.*, pp. 151-159, Bibliography of 6 Publications, February, 1918. III. TRUOG, E. Soil Acidity: 1) Its Relation to the Growth of Plants, *Ibid.*, pp. 169-195, Bibliography of 49 Publications, March, 1918.—IV. WHITE, J. W. Soil Acidity as Influenced by Green Manures, in the *Journal of Agricultural Research*, pp. 171-197. Washington, April 15, 1918.

I. **Effect of Ammonium Sulphate on Soil Acidity.**—It is well known that this manure increases the acidity of the soil to such an extent that, in extreme cases, it prevents crop growth. By means of experiments carried out in greenhouses the author undertook to determine the increase in acidity caused by ammonium sulphate, and the effect of removing part of the added nitrogen by means of crops. The results of the experiments show that in the soils treated with ammonium sulphate the increase in acidity was much greater than in the untreated control soils.

II. **Carbonic Acid in Relation to Soil Acidity Changes.**—The experiments aimed at determining the effect of applying CO₂ to soil on the acidity of the soil itself and of the plants. The results show that the application of CO₂ to cultivated soil which had been either only limed or both limed and fertilized, increased its acidity.

III. Soil Acidity and its Relation to Plant Growth.—From the data obtained from various sources the author has compiled a table showing the relation between the lime requirement of various plants and their response to the liming of acid soils, or, their capacity to grow in acid soil. He concludes that the amount of lime to be applied in practical agriculture depends on the lime requirement on the crop grown, the acidity of the soil, and the fertility of the soil. The lime requirement of a plant is governed by the following factors: lime content of the plant, rate of growth of the plant, and feeding power of the plant for lime. The chief disadvantage of the acidity of the soil is that it prevents the plants from drawing lime from the soil quickly enough to satisfy their requirements.

IV. Soil Acidity as Influenced by Green Manures.—The results of these experiments show that in acid soil, fresh green manure decreases the acidity when first dug in, but increases it later. Nitrification occurs under favourable temperature, moisture, and aeration conditions and the nitric nitrogen content of the soil increases, in spite of its acidity.

11—On the Actual Number of Bacteria in the Soil.—BRIGHT, J. and CONN, H. J., in *Abstracts of Bacteriology*, Vol. II, No. 1, Baltimore, 1918.

For years soil bacteriologists have been trying to find some satisfactory method for determining the actual number of bacteria in the soil. On account of the obvious weaknesses of the plate method a more accurate method is desired. The chief difficulties of the plate method are:—first, that many types of soil organisms will not grow on the ordinary nutrient media; and second, that groups of many individuals are often recorded as single organisms. A microscopic method of counting has recently been devised which eliminates these sources of error but introduces other possible sources, e. g., dead organisms may be counted if they take the stain; small organisms may be overlooked owing to the presence of masses of organic matter which may shield them from view, and particles of organic matter in the soil may take the stain and thus be counted as organisms.

A series of experiments has been carried out which indicates that:— (1) the plate count of normal soil is generally much lower than the corresponding microscopic count; (2) the plate count of sterilized soil re-inoculated with pure cultures of known soil organisms is much higher than the microscopic count in the cases of two of these organisms which are very small, and lower than the microscopic count in the case of another, large organism; (3) the normal flora is almost entirely disintegrated by the heat of sterilization; (4) there is a partial correlation between the plate and microscopic counts.

In short, wherever the organism has been known to grow on the plates the plate count has been as high or even higher than the microscopic count. The reason why the microscopic count in normal soil is so much higher than the plate count is because many of the organisms in soil do not grow upon the common nutrient media. As regards the actual number of bacteria in soil, it seems reasonable to assume that there may be 5, 10, or even 20 times as many organisms in normal soil as is shown by the plate method.

12—Isolation and Study of Nitrifying Organisms.—GIBBS, W. M. and FRED, E. B., in *Abstracts of Bacteriology*, Vol. II, No. 1, p. 1. Baltimore, 1908.

13—Effect of Carbon Dioxide Gas on Bacterial Numbers, Ammonification, and Nitrification.—NOYES, A. and YODER, L., in *Abstracts of Bacteriology*, Vol. II, No. 1, p. 3. Baltimore, 1918.

16—Sampling Field Plots for Bacterial Analysis.—I. NOYES, H. A., in *Abstracts of Bacteriology*, Vol. II, No. 1, p. 3. Baltimore, 1918.—II. NOYES, H. A. and VOIGHT, E., *Ibid*, pp. 3-4.

18—The "Integral" Method for the Growth of Cereal Crops.—PEQUITO REBELLO, J., in *Novos Metodos de Cultura*, pp. 272. Lisbon, printed by "A. Editora Lda" 1917.—II. *A Vinha Portuguesa*, pp. 261-263. Lisbon, October, 1918.

The author describes the method devised and applied by him which consisted in uniting a number of improved methods of cultivation advised (some a long time ago) by eminent experts and successful farmers. He describes these methods discussing them separately:—early and thin sowing made with well-chosen seed (HALLET method); repeated shallow cultivation between the rows to keep the soil fresher, and moister at a depth (Algerian or BOURDIOL method); an improved, worked summer fallow (JEAN method); sowing in small furrows that are filled up and rolled to encourage tillering (DEMTCHINSKY method.) The author's method which, for this reason is called "integral" consists in the following operations:—1) early sowing, after September; 2) choice of a variety with high tillering powers and very resistant to rust; 3) sowing in lines about 32 in. apart, with only $\frac{1}{3}$ the quantity of seed usually sown in the locality where the integral method is being applied; 4) sowing on furrows in the bottoms of which is put the manure or fertilizer and then the seed, which is covered with a shallow layer of soil so that the furrow in which the plant will appear remains open; 5) during the first stage of growth, hill up slightly once or twice, topping once or twice, and roll one or more times, which will result in greatly stimulating tillering and the

development of adventitious roots; 6) during winter, profiting from the wide spaces between the lines, a few small furrows are opened along side each row of cereal to help surface drainage; this operation can be combined with hilling up; the field is so arranged that the plants grow on the crest of a small ridge, leaving a larger and higher ridge in the midst of the space between the rows; (7) repeated harrowings should be given in spring, so that the field will be covered with a fine layer of soil that will prevent drying up and the growth of weeds; 8) in the following year, the same cereal, or that following in the rotation, will be sown in the space between the lines, where the soil has been rested and is yet perfectly prepared just as if it had been a cultivated fallow.

The author tested his method on his estate at Alemtejo with poor, tertiary soil, where ordinary methods hardly produce 8.9 bush. of wheat per acre; he obtained 11.1 bush., without needing a fallow and with a saving of 43 pints of seed and 178 lb. of superphosphate per acre. He states that he obtained an income of \$30.65 per acre in a district where the sale price of land is rarely more than \$5 per acre.

The integral method was also tried in the north of Portugal. In the "Posto Agrario" of Minho Litoral 45 bush. per acre were obtained with a quantity of seed equal to 56 per cent. of that usually sown, whilst the crop grown by ordinary methods had never been more than 11.1 bush per acre; fine ears were obtained.

In the district of Caldas das Taipas, a well-known agriculturist, Dr. S. GARCIA, tried the method, and obtained a yield of 575 fold with rye and 126 fold with wheat. The latter formed tufts having a many as 130 stems and very fine ears; there was a saving of both seed and fertilizer.

20—The Chemical Effects of Applying Lime to the Soil.—I. HOAGLAND, D. R. and CHRISTIE, A. W. The Chemical Effects of CaO and Ca CO₃ on the Soil. Pt. I. The Effect on Soil Reaction, in *Soil Science*, pp. 379-382, Bibliography of 7 Publications. Baltimore, May, 1918.—II. CHRISTIE, A. W. and MARTIN, J. C., The Chemical Effects, etc. Pt. II. The Effect on Water-soluble Nutrients in Soils, *Ibid.*, pp. 383-391, Bibliography of 13 Publications.

32—Effects of Hybridisation on the Productivity and Earliness of Maize, in Connecticut. U. S. A.—JONES, D. F., HAYES, H. K., SLATE, W. L. SOUTHWICK, B. G., in the *Fortieth Report of the Connecticut Agricultural Experiment Station*, pp. 323-347, Bibliography of 15 Publications. New Haven, 1917. (2 pp in Institute Bulletin.)

35—The Effects of Cross and Self-Fertilisation in Tomatoes.—HAYES, H. K. and JONES,

D. F., in the *Fortieth Report of the Connecticut Agricultural Experiment Station for the Year 1916*, pp. 305-318. New Haven, 1917. (2 pp. in Institute Bulletin.)

39—Comparative Cultural Experiments with Aurora and Manitoba Wheats in Vaucluse, France.—ZACHAREWICZ, in the *Comptes rendus des Seances de l'Academie d'Agriculture de France*, pp. 878-880. Paris, August 14, 1918.

45—Our Knowledge of Textile Fibres.—MICHOTTE, F. in *La Revue de la Filature et du Tissage*, Year II, No. 11, pp. 215-219 and No. 12, pp. 271-275. Epinal, 1917.

The author, a well known expert on textile fibres, shows in his note that there is practically nothing on textile fibres in scientific literature, whether French or foreign. With the exception of the "*Travail des Lins*" (Linen Working) by A. RENOARD and "*Les Textiles vegetaux*" by H. LECOMTE, good, but out-of-date works, the publications on textile fibres either cannot be found or are subject to serious criticism. The author points out some of the very numerous and serious faults of these works.

There is a certain number of serious works on a few textile plants and their relative industries (*Le Maguey*, by SEGURA; *Le Sisal*, by MARQUÈSS; *L'Agave*, by MICHOTTE; *The Sisal Fibre Industry in Queensland*, by A. J. BOYD; various publications by W. TRELASE on *Californian Agaves*; *Les Sansevieres*, by MICHOTTE; *Le Raphia*, by DESLANDES; *Vegetable Fibres*, in the *New Bulletin*; various studies published in the *Annales du Musee Colonial de Marseille* and in the *Agriculture des Pays chauds*; a study on Manila hemp and Agaves in the Philippines, by A. W. TAYLOR), but, out of 700 genera, only 5 or 6 have been dealt with more or less exhaustively, while 20 or 30 others have been treated in detached, incomplete and scattered papers.

Only 5 or 6 paper-making plants have been studied in scientific literature, whilst the author counts, besides bamboo, papyrus, alfa, diss, sparta, spartum, banana, pineapple, the yuccas, and the palms, 63 interesting species of plants, several of which have varieties growing in natural stands and mostly producing paper similar to that of alfa. It may be said that paper-makers are unaware of 92 per cent of the materials that they might use.

The author, wishing to remedy as far as is possible this state of affairs, has written a "*Traité scientifique et industriel des plantes textiles*" (Scientific and technical treatise on textile plants), now in course of publication, and which, owing to its length (10 volumes of 600 to 1,000 pages) will give a complete study of all the known textile plants; it will show that very little information is available regarding many of these plants.

62—**Tobacco Nurseries in the Dutch East Indies.**—I. YENSEN, H., Considerations on Tobacco Nurseries, in the *Mededeelingen van het Proefstation voor Vorstenlandsche Tabak*, No. XXXIII, pp. 41-55. Semarang, 1918.—II. RIJKEN, G. I., New Method for Thinning-out Tobacco Nurseries, *Ibid.*, p. 37.

I.—The grower should try to obtain strong, resistant tobacco plants by providing them with abundant food, water and sun. The nurseries should be suitably manured by spreading soil as evenly as possible and mixing a certain amount of sand or compost.

Instead of watering the plants the water they require should be run around the lands (ridges). The soil must be moistened in an intermittent manner, so that it shall not remain water-logged. The nurseries must be exposed to the light, and from the beginning the young plants should be accustomed to the heat of the sun.

The nurseries are protected against heavy rains by artificial shelters. The plants should only be transplanted when they are about 18 inches high, as is done by planters in Deli. The shade leaves should be suppressed.

II.—The thinning-out of a tobacco nursery so as to leave the plants spaced at 2 inches distance—as is now done in most plantations—is a fairly difficult task for a coolie. To avoid this difficulty the author suggests the following practical method: by means of string, the seed bed is divided into 10 equal divisions on its length and 4 on its breadth, so as to have 40 equal plots. All the coolie has to do is to leave 25 plants in each plot, so that there would be $40 \times 25 = 1,000$ plants on each land, which gives sufficient material for transplanting.

63—**Reports on Tobacco Fermentation Experiments Made in the Dutch East Indies, in 1916.**—SIDENITS, E., in the *Mededeelingen van het Proefstation voor Vorstenlandsche Tabak*, No. XXXI, pp. 15-57. Semarang, 1917.

67—**New Method for using Explosives in Planting Trees and its Advantageous Use in the Rapid Reconstitution of Orchards in Devastated Regions.**—PIÉDALLU, A., in the *Comptes rendus de l'Académie des Sciences*, pp. 763-764. Paris, November 18, 1918.

The author has noticed that wild plants grow with rare vigour on the edges of old shell holes or old trenches destroyed by explosives. This vigour is probably due to the cracking of the soil and its impregnation by nitrogen compounds. This remark recalls the experiments made in the Western United States on planting 2-year old cherry trees in holes blasted out by dynamite. The cherry trees planted in this way reach a height of 10 feet, while the same trees planted with a spade remained weakly, barely reaching 5 feet in height.

The author has attempted to apply these observations and experiments practically with the collaboration of M. MALHOUE.

They have found out the composition of an explosive that resists shock and damp, which can be moulded, is quite free from chlorine, is very powerful in small volume and only explodes under the action of a fulminate primer. This forms a cartridge to which is added a bottom of fertilisers, varying according to the soil:—phosphates, nitrates, potash, etc. The cartridge is formed of a celluloid tube, in strong paper or cardboard, serving as an envelope and ending in a cone or closed by a stopper of the same form. The compressed fertiliser is placed in the bottom of the tube round some explosive, then comes the cylinder of explosive in which there is a hole to receive the fulminate primer. The whole is closed by a cork pierced with a hole, through which passes, in a somewhat tight fit, the bickford match attached to the primer. The explosive and the accessory bottom are paraffined on the outside.

To use the cartridge, a 24-inch hole is made with an iron rod or other tools. In suitable soil the hole is made with a wooden cone and a diameter slightly greater than that of the cartridge, down to a depth of 24 inches the cartridge is inserted, the match lit, when those present retire to cover.

The explosion produces a spheroidal cavity nearly 32 inches deep, with deeply cracked walls. The soil is left to absorb the vapours given off by the explosion and all that remains to be done then is to plant the tree and beat down the soil round the roots. Under these conditions the tree finds all the elements necessary for its growth finely powdered and intimately mixed with the soil, so that it cannot but grow vigorously and fruit in the shortest possible time. This method would be specially useful in compact soils where the ordinary methods of planting leave solid walls which the rootlets are unable to penetrate.

This process can be used for all kinds of tree-planting, even in the colonies, as less labour is required and growth is favoured.

LIVE STOCK AND BREEDING

78—**Curative Treatment of Horse Mange.**—

TORTI, E., in *Il Nuovo Ercolani*, Year XXIII, No. 19, pp. 241-250. Turin, 1918.

Before the war, horse mange attracted the attention of practitioners in a limited measure only, on account of the easy treatment and the facility of prophylactic measures, but, during the war, it has assumed such proportions in all the armies, that it alone has given more work to the veterinary surgeons than all the other diseases put together.

As the author had the opportunity of treating a group of 300 horses, he proposed to find the experimental answer to the following questions: 1) Does a remedy exist that can prevail absolutely over the others?; 2) Which treatment is preferable from the

standpoint of economy and rapid action?;
3) Can horse mange be cured by an exclusively mechanico-detersive treatment, without the intervention of any medicament?

The treatment consists in:— dipping followed by washing twice all over with a 5% sodium carbonate solution; carefully cleaning the epidermis; curative treatment (5 applications at successive intervals of 4, 5, 8, 13 days) with the mange remedy tested (which, for the different groups of animals was one of the following:— crooline; phenolised extract of tobacco; sodium hyposulphite and hydrochloric acid; soap solution of formol; sulpho-alkaline soap; HELMERICH pomade; mercurial ointment); currying; douches; cleansing and disinfection of the stables; etc.

Six weeks after beginning treatment (i.e., after 5 applications), 20% of the animals were cured; this percentage belonged mostly to the groups treated with pomade; the rest of the animals received 2 or 3 applications of HELMERICH's pomade or mercurial ointment, or simply melted horse fat and were then washed all over with the phenic extract of tobacco. After 20 days, 50% of the animals, that were still affected were cured and, after two and a half months the malady had entirely disappeared.

CONCLUSION.—1) Of all the mange remedies tested by the author there is no one that is absolutely superior as regards its therapeutic efficiency.

2) In the case of severe mange of long standing, the best treatment is the mixed one, consisting in the use of a watery solution and a fat, while, in less severe and recent cases, a simple watery solution suffices (e.g., phenic extract of tobacco); manual care should be considered as an integral part of the treatment.

3) A simple mechanico-detersive treatment (very diligent manual attention, washing with water, and, in the graver cases where this treatment does not suffice to detach the epidermal crusts, anointing with horse fat) suffices to cure mange, no matter how serious or of long standing it may be.

84—Meat Production in Relation to the Capacity of Cattle to Gain Weight, Investigations made in Italy.—ARUCH, E., in

L'Italia agricola, pp. 269-271. Piacenza September 15, 1918.

One hundred steers were chosen at Parma, all having special capacity for gaining weight, and 20 steers with the opposite characters. The two lots were kept under observation during 30 days under identical conditions and were fed identical rations. At the beginning of the experiment the 100 steers chosen weighed 88,651 lb. and at the end 94,740 lb., i.e. their live weight increased by 6,089 lb. in 30 days, or 2.29 lb. (or 0.221%) per head daily. The corresponding figures for the 20 unselected steers were 20,565 lb., 21,025 lb., 459 lb., 0.76 lb., (0.072%).

In a similar experiment made at Lodi, 50 selected steers gave, from September 12 to October 12, 1917:—initial weight 39,188 lb., final weight 41,406 lb., increase in live weight in 30 days 2,218 lb., daily gain per head 1.73 lb., percentage gain 0.221. The corresponding figures for 20 unselected steers were:—20,108 lb., 20,603 lb., 495 lb., 0.825 lb., 0.822%.

The two experiments, carried out independently of each other, gave, therefore, results which are in perfect agreement and of great importance. The author recommends the time taken up in central depots for observation and the necessary rest to be utilized in obtaining the greatest possible increase in live weight by removing the steers with low fattening qualities first and those with high fattening qualities last. He himself uses this method with excellent results and without any disorganization of the service.

FARM ENGINEERING

95—Importation of Agricultural Machinery into Russia during 1917.—*Feuille d'Informations du Ministère de l'Agriculture*, p. 4. Paris, November 12, 1918.

The *Torgovo Romyshlennaya Gazeta* has published the latest statistic regarding the importation into Russia, across European frontiers, of agricultural machinery and implements for the first 8 months of 1917, in comparison with the same period of the 4 previous years, as is shown by the following table:—

Years	Lb.	\$
1913.....	254,196,000	20,914,000
1914.....	243,852,000	18,989,000
1915.....	4,338,000	515,000
1916.....	17,362,000	2,613,000
1917.....	46,414,000	8,363,000

This table shows that the machinery imported during the first 8 months of 1917 represents 18% of the importation in 1913, while it is 10 times greater than that in 1915,

always for the same period. As regards the kinds of machinery imported this is shown in the following table:—

	1913	1916	1917
	Lb.	Lb.	Lb.
Machines for cultivating	43,272,000	90,000	715,000
Drills, etc.	18,360,000		256,000
Harvesters	71,960,000	8,453,000	39,823,000
Threshers	33,532,000	277,000	263,000
Separators and cleaners	2,790,000		32,000
Machinery for forage	2,052,000		137,000
Mechanical engines	34,020,000		342,000
Other agricultural machinery	48,190,000	7,732,000	4,846,000

Amongst the chief countries that exported these machines to Russia before the war, Germany took the first place with 33% of the total import followed by the United States with about 30%, England with 17%, Austria, etc. Since the war this situation has changed; in 1917, the United States furnished 77.6%, Sweden about 10%, followed by Finland and England.

99—The System of Electric Ploughing (1) of the "Société Générale Agricole".—SONIA, P., in *La Petite Revue Agricole et Horticole*, pp. 154-155 Antibes, October 17, 1918.

M. AMEDE PETIT, Delegate Manager of the "Société Générale Agricole," 44 Rue du Louvre, Paris, has just finished a windlass machine for electric ploughing.

The S. G. A. ("Société Générale Agricole") electric ploughs consist essentially of 2 windlasses alternately pulling a reversible balance plough, with 6 shares for ploughing to 8 to 10 inches, and 4 shares for depths of 12 inches, and digging 4½ inches in addition. They can work on lengths of from 210 to 700 yards over surfaces of at least 10 acres. They work on a power station to be founded or from a distribution network. In both cases the current is supplied from fixed, generally high tension wires. It is taken to a movable transformer cabin by a free cable laid on the ground or carried on light, displaceable posts.

The feed lines from the movable transformer cabin supply the windlasses in the fields. The plant works with mono, bi or triphase current of any periodicity of high voltage up to 25,000 volts. The windlass frame carries in front a 50-H.P., 4-cylinder heat engine and, behind, an electric motor, of 100 H.P. (synchronous triphase) continued, and 150 H.P. for a short period. The heat engine is used when the area to be ploughed is too large for the cable or in case of a breakdown of the current.

The 2 motors drive a transverse shaft through a compound gear box, the transverse shaft drives, on one side, through a grooved pinion, a gear driving the rear wheels, and thus moving the machine forward; on the other side the shaft drives, by a conical member which, through clutch, drives a toothed

wheel, wedged on the drum with a vertical axle, on which the steel cable rolls for hauling the agricultural implements.

Each windlass is in charge of 1 man. When the work is done, each windlass is coupled up to the plough, forming 2 trains which move at a speed of 4 miles per hour towards the next work. The staff is housed in the movable cabin, divided into 2 parts one containing 8 beds and the necessary furniture, the other acting as a transformer cabin. The S. G. A. set has the advantage that the machines work day and night; there is a saving of 6 oxen, 2 men, and coal; automatic safety devices; quick work no matter how sloping the land is.—

As regards the work the S. G. A. guarantees in open loam in good condition, without stones, without too much undulation for ridges at least 400 yards long:

(a) for work per hour:—ploughing at 6 inches, 25 to 27 acres; ploughing at 9 to 10 inches, 18 acres; ploughing at 12 inches plus digging 6 inches, 12 to 13 acres.

(b) for consumption: ploughing at 6 inches, 35 kilowatts per hectare (2½ acres) at 9 to 10 inches, 45 kw. per hectare; at 12 plus 6 inches 90 to 100 kw.

98—The Use of Tractors for Lifting Beets.—

PLUCHET, E., in the *Comptes rendus des Seances de L'Academie d'Agriculture de France*, pp. 940-945. Paris, November 6, 1918.

The author communicates a note by M. BACHELIER, describing observations suggested by the use of a tractor in lifting beet on the Mormant estate. In 1918 M. BACHELIER used a 40 H.P. FULTZ tractor towing a BAJAC lifter working 3 rows, the front wheels of the tractor straddling over one row, the back wheels arranged specially so as to pass in the spaces between the drills. Work was begun right away, no adjustments being required.

The machine is very easy to steer; the beet lifter does not deviate from a straight line, as always happens with a team of horses; no roots are damaged and the work is perfect. On an average 7½ acres were lifted per day, with a consumption of 5 gallons of petrol per day.

The cost of the work appears to be much the same as with a team, but, with the

(1) See also AGRICULTURAL GAZETTE, March, 1919, page 307, No. 1144.

tractor, the work is done much more quickly, leaving free the teams that are so urgently required for other work at that time. "It is not a question of chance, says M. BACHELIER, in conclusion, that the tractor moves over the beet field without causing the slightest damage. Here, as in many other cases, one can see the value of the practical men, who had been consulted as to the construction of the tractor."

The tractor replaces 12 oxen, and, as M. PLUCHET says, such an economy is of serious value at that time, when sowing is being done. Regarding tractors, the author points out how numerous are the farmers in the Paris district who, after the harvest, have used the tractors for breaking-up stubble, shallow cultivation, and, finally, for autumn ploughing. He considers that, thanks to this equipment, the land in his district has been got into excellent condition; such work on the land, which had been neglected for several years, will certainly have a good effect on the crops.

100—**The International Harvester Corporation's Sheaf Shocker.**—*The Implement and Machinery Review*, p. 762, London, November 1, 1918.

Description of the sheaf shocker made by the INTERNATIONAL HARVESTER CORPORATION of Chicago. As the bundles come from the binder deck, they are transferred by a fork to the shock setter, the bundles being alternately deposited first on one side of the setter and then on the other, the butts being spaced and the tops overlapping, so as to make a wedgeshaped shock. When the setter has received sufficient bundles to make a shock, a trip is automatically operated, this causes the shaft of the shocker knottor to rotate and to operate the compressor arm and the needles, which compresses the bundles and ties them together. The shock-setter is wider at the rear than at the front to assist in making shocks that will stand well when discharged. It is provided with an inclined bottom, which is pivoted, permitting it to tilt to the rear and discharge the shock after it is compressed and tied. The arm under the shock setter has a roller at the end which comes in contact with the shock setter bottom. This arm is rocked in such a way as to tilt the bottom of the shock setter with a quick movement which sets the shocks squarely on the ground. When the shock-setter tilts to discharge the shock two times spread the butts of the back and corner bundles to give the shock a substantial base. The crankschaft of the binder transmits the necessary driving power to the shocker, and the draft connection between the two machines allows the shocker to move independently of the binder when working on uneven ground.

This machine was much used in 1918 in American and Canadian harvest fields, but it will not be placed on the European market until its success has been completely established in America.

101—**Technical Considerations on the Use of Sorters.**—RINGELMANN, M., in the *Comptes rendus des Seances de l'Academie d'Agriculture de France*, Vol. IV, No. 29 pp. 810-814 and No. 30, pp. 843-846, Paris, October 2 and 9, 1918.

In a communication to the French Academy of Agriculture on the use of sorters, the author recalls that he carried out tests on the agricultural model of the MAROT sorter, with a diameter of 18.6 inches, and an alveolar cylinder 6 feet 10.6 inches long, then worth \$65 and costing, in 1917, \$186.

This machine can deal with 11 bushels per hour; to obtain perfect sorting not more than 200 litres (5.4 bushels) of seed must be fed to the sorter per hour, which, with loss of time owing to adjustments and ordinary stoppages amounts to a practical delivery of 150 litres (4 bushels) per working hour. To sort well, the thickness of the layer of seed in the cylinder, the slope and speed of this latter, should not exceed certain limits, or a fairly large amount of seed will not be thoroughly sorted. By repeated tests the author found that the best conditions for different wheats (1 Prince Albert wheat and 1 March Saumur wheat) corresponded to 38 turns of the handle per minute and, to sort 220 lbs. of wheat, 500 turns of the alveolar cylinder and 1818 turns of the handle; little energy is required (2 kilogrammeters per second).

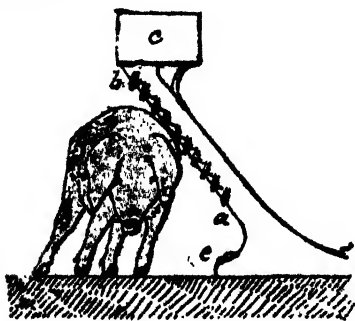
Some March Saumur wheat, bought from a seed merchant as seed wheat gave the following results (by weight) on sorting: various seeds, waste, 15.4%; small and broken seed, suitable for poultry, 4.6%; medium wheat that can be used for milling, 23.2%; fine seed wheat, 56.8%. Thus, to obtain 220 lbs. of seed wheat 390 lbs. of seed sold for sowing had to be treated. In order to find the effect of sorting on the crop obtained, in 1893 the author, in collaboration with J. F. BERTHAULT, Professor of Agriculture at Grignon, carried out tests with March Saumur wheat, drilled in spring in loamy soil, at the rate of 2.8 bushels of seed per acre. Saumur wheat is a soft, beardless wheat, requiring little attention, early and giving as much as 37 bushels per acre in the Beauce region. The results, reported to the author's friends and pupils, were in 1893, an abnormally dry year, as follows for unsorted and sorted wheat per acre: drilled, 2.8 bushels in each case; grain harvested, 25 and 43 bushels; straw, 5,160 and 6,230 lbs.; chaff and small straw, 473 and 813 lbs.; total crop, 7,120 and 9,620 lbs.; weight per bushel wheat obtained, 62 and 63 lbs. The increase in favour of sorting is 18 bushels of grain, 1,070 lbs of straw, 340 lbs. of chaff, etc., and 2,500 lbs. for the total crop.

Besides the obvious influence of sowing better seed obtained by sorting or mechanical selection, the increase is due to the diminution of weeds, which absorb water to the detriment of the wheat; this was all

the more so as 1893 was a very dry year. From a scientific standpoint the author concludes that sorting, as it leaves a certain amount of water available for the plants, constitutes a special kind of *irrigation*.

According to M. GAROLA, a spring wheat yielding 5,300 lbs. per acre, (30 bushels of grain and 3,500 lbs. of straw) and representing 4,500 lbs. of dry matter (the crop contains 15% of water), absorbs 2,460 cubic feet of water, or a layer 6.8 inches thick. According to several investigators, spring wheat has to evaporate 338 gm. of water in order to elaborate 1 gm. of dry matter; the author carries this figure to 340 in the following calculation. The extra crop shown above consisting of 2,500 lbs. per acre, containing 16% of water, represents 2,180 lbs. of dry matter, or a consumption of 153 lb. of water per sq. yard, or a layer of 3.26 inches of water that has not been absorbed by weeds in that part of the field sown with sorted wheat, and which remains available for the wheat.

In an average year the annual rainfall at Grignon is 21.1 inches with a general average of 5.8 inches of rain for April, May and June; the figures for 1893 were much less. The 3.26 inches of rain calculated above show clearly that mechanical sorting (as well as a better choice of seed and, for the same amount of seed, a greater number of good seeds distributed per unit of surface) has resulted in leaving more water at the plant's disposition; it is thus an indirect method for providing the crop with water. The author thinks that the increase by 1.2 lb. of the weight per bushel of grain is due especially to selection of the seed through sorting. Plant physiologists give no data regarding the water requirements of weeds. The author thinks that by sowing well selected seed mixed with weed seeds, the crop would be less, the conditions being the same, than that obtained by sowing less fine seed, free from weed seeds. The question of seed purity thus seems to precede that of selection as regards agricultural hydraulics.



AMERICAN HOG OILER

In the large piggeries of the United States hog oilers are used, mounted on a cast iron stand fastened to the ground. Some models have 3 vertical brushes; others, apparently more suitable have a single brush *ab* (see Fig.) fixed at a slant under the reservoir *c*; the foot *de* should be firmly fixed to the ground to withstand the pressure caused by the pig.

In Illinois, one hog oiler is said to be sufficient for an enclosure containing from 30 to 50 pigs. The liquid used is an anti-parasitic oily compound or water to which are added a few drops of creolin or cresyl. The flow of the liquid, regulated by a small tap, is about 6 to 10 cc. per hour.

103—**The Utilisation of Industrial Alcohol and Hydrocarbides for Carburetting in France.**—*Le Génie civil*, pp. 225-228. Paris, October 6, 1917.

105—**Mechanical Pressure Silos.**—SAVAZZINI, G., in the *Rivista d'Agricoltura*, pp. 334-336. Parma, October 18, 1918.

These silos devised by Dr. SAMARANI Director of the "R. Stazione sperimentale di batteriologia agraria" of Crenia, Italy, have the shape of long tubes with an octagonal base and conical cover. The framework is made of iron or wood, carefully joined so as to prevent completely the entrance of air. Between the walls slides a strong cover, raised by tackle-ropes or a windlass and metal cables. The object of the cover is to convey to the forage below the pressure exercised by a large screw and an arrangement similar to that of the MABILLE press. Near Crema, province of Mantua, have been built several of these silos, some large enough to hold 196 tons of green fodder. A form for small farms is also built and holds about 10 tons of fodder.

In green fodder thus compressed there is abundant emission of carbonic acid produced by the respiration of the plants. The escape of this gas is prevented by the hermetically closed cover and is retained almost entirely by the fodder, preventing its vital functions and, consequently, heating. The fodder, therefore, undergoes very slow and limited changes, the proteins are not appreciably modified, and the sugar is changed partly into acetic acid and partly into lactic acid, which has an anti-putrifying action. One hundred tons of grass, yield about 18 to 20 tons of ordinary dry hay, whereas with the pressure system, 80 tons of ensilage are obtained. As the daily ration of an adult ox is about 40 lb. of hay and 77 to 88 lb. of ensilage, the same amount of grass will give a double number of rations if it be ensiled in this manner instead of being made into hay.

The author examined a sample of fodder ensiled under pressure and found it excellent, perfectly preserved, of a fine green colour, the flowers almost of their natural colour, soft to the touch, and of a characteristic

102—**American Hog Oiler.**—RINGELMANN, M., in the *Journal d'Agriculture pratique* p. 398 Paris, October 3, 1918.

light and pleasant odour. He foretells the general adoption of this system, especially on small and medium-sized farms.

AGRICULTURAL INDUSTRIES.

121—Deterioration of Eggs Considered from the Point of View of Sanitary Inspection.—MARTEL, in the *Revue Scientifique*, Year LVI, No. 17 pp. 532-533. Paris, 1918.

Candling in a dark room is the best method of testing eggs. The author's investigations led him to classify the spots reported by professional candlers. He shows that GERMAIN's hypothesis, that eggs with mobile spots are practically exempt from bacteria, is subject to exceptions.

Mobile spots usually show beneficial changes—thick chalazas, foreign bodies, dark yolk, autolysis of the white with setting free of chalazas, embryo little developed.

Eggs with so-called "*red rot*" are distinguished by the presence of diffused shadows or cloudiness, and the contents are reddish, showing the broken yolk to be mixed with the white (eggs rarely rich in bacteria, but attacked by mycelium where the yolk is in contact with the shell). On account of the very marked and often disagreeable smell and flavour of these eggs, they are refused by the consumer.

Long incubated eggs show the same characteristics as those with red rot.

In *very old eggs* the yolk adheres to the shell at a point diametrically opposed to that on which they are resting; turning the eggs sharply during candling prevents this adherence.

Mouldy eggs have spots, called "*mouldy or damp*", which are always immobile and very obvious; the centre of these spots turns black, some times red or violet (presence of chromogen bacteria). The large, fixed spot is observed especially in eggs on sale at the end of summer or in winter. Numerous damp spots are found especially in summer in badly packed eggs or those sent by sea (Moroccan or Russian eggs). The ascomycetes most commonly found are *Aspergillus* and *Penicillium* (in the ratio of 3:1 in 114 hen's eggs studied by the author). Eggs showing, when candled, concentric halos round the mould spot contain colonies of bacteria which can easily be distinguished from the moulds, even with the naked eye. Mouldy eggs often contain no bacteria. Eggs which have recently become mouldy may be used in biscuit-making, but mouldy eggs containing bacteria give off a disagreeable smell and are unfit for consumption.

Eggs with so-called "*black rot*" are often spotted eggs, the central black part of which has spread gradually till it has invaded the whole egg. All forms of putrefaction have not yet been described.

Badly frozen eggs (faulty packing, insufficient freezing) usually show at first

small, red spots of dampness which become large black spots and rapidly spoil the egg.

The putrefaction of eggs preserved in lime is easily distinguished. In addition to the characteristics of the shell (roughness, fragility, great porosity) the white of such eggs is very transparent. The yolk is also extremely mobile and appears, through the watery white, as a shadow of marked outline, and of a colour varying from tawny to sepia-black, according to the degree of putrefaction. The yolk of very bad or "*burnt*" eggs does not adhere to the shell, but when broken, gives off a disagreeable smell. The yolk is dark and liquefied, the white almost always reddish and rich in bacteria. Deterioration affecting the taste and colour are not shown by candling. Fresh eggs very slightly affected by bacteria during development have all the characters of healthy eggs.

These data, whilst showing the difficulties with which a service for the sanitary inspection of eggs has to contend prove that, in most cases, candling may be satisfactorily adopted.

123—The Action of Cold on Micro-organisms.

RUATA, G. Q., in the *Rivista del Freddo*, Year IV, No. 4, pp. 120-126. Rome, April 10, 1913.

It is known that artificial cold does not destroy germs capable of damaging food-stuffs, while it does paralyse their development by rendering them inert and harmless for as long as its action lasts. This is based on work done long since by MACKENDRIK, BROWN & ESCOMBE, THISTLETON-DYER, MACFAYDEN, and others, which has shown that bacteria, and plants in general, resist low temperatures, not only those obtained with ordinary refrigerating machines but even those obtained with liquid air ($-190^{\circ}\text{C}.$) and liquid hydrogen ($-250^{\circ}\text{C}.$).

The author has long accepted this opinion, but he has often had the occasion, during his experience of the application of artificial cold to the cold-storage industry, of pointing out facts that are apparently in contradiction to the generally accepted theory. For this reason, he decided, towards the end of 1914, to carry out a series of experiments with the object of ascertaining whether, besides the suspension it is known to cause of microbial action, cold does not also produce a deeper or more directly germicidal modification.

Owing to the war the author could not extend his experiments as far as he would have liked, but the results he has so far obtained are already sufficiently conclusive. For the work a small AUDRIFFREN SINGRUN (1) refrigerating machine was used, in which the temperature was constantly kept between -3° and $-12^{\circ}\text{C}.$ in a dry environment. The organisms under study were treated in this apparatus and their behaviour was studied both as regards the alteration of their biological properties as well as the final abolition of their vitality.

RESULTS.—(1) The researches on the vitality of *B. coli* showed that:—(a) the action of cold retards the growth of the organism; (b) the action is progressively germicidal, for the destruction of the culture begins to be apparent after 4 to 6 days and is complete in 115 to 120 days.

(2) The researches on the biological properties of *B. coli* showed that cold, save some slight delays in development as compared with the controls, produced no modification.

(3) Researches on the vitality and pigment formation of *B. pyocyaneus* showed:—(a) that this organism, like *B. coli*, is progressively destroyed by the action of cold; (b) that pigment formation is unaffected as it continues as long as traces of vitality remain.

(4) Researches on the power of *B. pyocyaneus* to liquefy gelatine showed that the prolonged action of cold destroys this power. This organism, sown on an agar plate on December 17, 1914, was already destroyed on March 12, 1915, while, inoculated in the thickness of the gelatine, it was still living on June 15, 1915.

(5) Researches on the power of *Staphylococcus pyogenes aureus* to liquefy gelatine showed that, within the limits of time during which the exposure in the refrigerator lasted (from December 17 to various dates up to June 20), there was a notable and progressive delay in liquefaction, in comparison with controls under normal conditions, without, however, destroying the liquefying power.

(6) The haemolytic power of the above organism was clearly reduced during the period of experiment (December 17, 1914, to June 20, 1915).

(7) Cold destroys the liquefying power of *Bacillus proteus vulgaris*.

(8) No modification was noted, while the experiments continued (up to June 20, 1915) in the power of *B. proteus vulgaris* and *B. bulgaricus* to coagulate milk.

(9) Researches on the amylolytic power of *Bacillus clavatus* Biffi showed that, under the prolonged action of cold this organism completely loses its amylolytic power, which is normally very vigorous.

(10) The spores of *B. clavatus*, which are amongst the most resistant ones known, are clearly and gradually killed by the prolonged action of cold. The way the experiment was going suggested that, could it have been prolonged, the culture plate would have been completely sterilized.

(11) The resistance of the cholera vibron to cold is very weak, while, however, its agglutinability is unchanged.

(12) The experiments on the vitality of *Bacillus fluorescens non liquefaciens*, *B. coliforme*, a liquefying *Streptococcus* that coagulates milk, *Bacillus prodigiosus*, *B. proteus vulgaris*, although more limited than the previous ones, confirm the germicidal action of cold in comparison with organisms other than those used in the work. These

results are of great interest as regards organisms isolated from putrefying meat.

These results lead to the conclusion that cold produces more profound and definite effects on micro-organisms than has been so far admitted. The author intends to continue his experiments and hopes to arrive at conclusions of interest regarding the technique of the preservation of foodstuffs in cold storage.

124—The Influence of Cold Shock in the Sterilisation of Canned Foods.—BUSHNELL, L. D., in *The Journal of Industrial and Engineering Chemistry*, pp. 432-436. New York, June 1, 1918.

Thirteen experiments were made to determine the effect of different methods of sterilizing tinned vegetables. The investigations included:—(1) the effect of heating to boiling point for 5 to 20 minutes and sudden cooling by immersion in iced water; (2) effect of intermittent heating followed by rapid cooling; (3) the necessity of complete sterilization; (4) the result of hermetic closing. The vegetables used were peas, green beans, beets and sweet corn. Control experiments were made with bacterial cultures from badly preserved foods.

CONCLUSIONS.—Blanching does not reduce the time required properly to prepare tinned foods. Small amounts of salt are of little value in preventing the development of bacteria in tinned foods. Small amounts of organic acid (acetic acid) have a distinctly retarding action on bacterial growth in tinned vegetables. The use of small quantities of acid is advisable wherever it will not injure the texture, flavour, or appearance of the product. In many cases an unsterile product will keep indefinitely if properly sealed. This, however, is not true in all cases, and sealing should not be relied on to take the place of proper sterilization on account of the danger of loss through spore-forming anaerobes.

125—The Commercial Freezing and Storing of Fish.—CLARK, E. D., ALMY, L. H. and PENNINGTON, M. E., in the *U. S. Department of Agriculture, Bulletin No. 635*, 9 pp. Washington, March 9, 1918.

The commercial method of freezing and storing fish as at present adopted and its effect on the fish are considered. Freezing and storage will keep fish in the condition in which it is received for several months, but will not remedy deterioration due to previous heating or bad handling. Only fish in perfect condition should, therefore, be accepted by freezers. Unless delivered 3 or 4 hours after being taken from the water, fish should be kept in ice in the boats. In many freezing plants it is necessary, to obtain a good product, to freeze rapidly at as low a temperature possible and store the fish as soon as it arrives. Freezing, by enclosing the fish in a coat of ice, prevents loss of moisture, protects the fish from moulds and bacteria,

(1) See also AGRICULTURAL GAZETTE, February, 1919, page 199, No. 1029.

and makes it less subject to mechanical injury. Fish to be stored for more than 3 to 5 months should be re-frozen occasionally, as in time the ice evaporates, even at low temperatures. The most economical temperature at which to store fish is probably a constant one of from 0° to 15° F., although some freezers maintain that lower temperatures help to defray evaporation of the ice coating. Packing the fish in boxes before storage helps to prevent loss of the coating and protects it from mechanical injury. Properly frozen fish reaches the retailer in excellent condition; it should be kept frozen till sold. Thawing fish by warming or soaking greatly lessens its food value and flavour. Chemical analyses showed no appreciable change in fish stored 27 months, i.e. much longer than would be necessary or profitable in storing it commercially.

PLANT DISEASES

133—**Resistance of Different Varieties of Wheat to Bunt (*Tilletia Tritici*) in the United States.**—GAINES, E. F., in *Journal of the American Society of Agronomy*, Vol. X, No. 5, pp. 218-222. Washington, 1918.

The results are given of a series of comparative cultural experiments made to study the behaviour and susceptibility to bunt of the principal varieties of wheat grown in the States of Washington, Oregon and Idaho. The grain was strongly infected with spores of the fungus and sown on the same day each year under as uniform cultural conditions as possible. The experiment lasted three years, from 1915 to 1917. The percentage of plants infected at the time of harvest varied considerably for each variety. The averages for the three years 1915 to 1917 were:—Turkey, 26.96; Alaska, 18.60; Fortyfold, 76.40; Red Russian, 83.65; Salzer's Marvel, 93.20; Triplet 91.27; Winter Bluestem, 93.24; Little Club, 87.75; Jones Winter Fife, 94.17; hybrid 143, 93.54; hybrid 123, 96.42; hybrid 108, 93.62 and hybrid 128, 95.10.

The two most important varieties from a commercial point of view are distinguished from each other, one by strong resistance (Turkey), the other by great susceptibility (Red Russian).

135—**Rye Ergot on Manitoba Wheat, in Upper Savoy, and on Alsatian Buckwheat in Upper Saône.**—I. CHIFFLOT, J., in *Comptes rendus des Seances de l'Academie d'Agriculture de France*, Vol. IV, No. 33, pp. 931-934.—II. FOURRIER, P., *Ibid.* No. 37, p. 1021. Paris, 1918.

I.—The cultivation of Manitoba wheat has spread greatly in Upper Savoy. Excellent yields were obtained with the early crops, grown only on small plots (4,300 to 5,380 sq. feet). The seed, sown very close because of the very limited tillering of this wheat, gave plump ears on stiff straw, and ripening

was almost complete on August 19. Many of the spikelets near the tip of the ear were abortive. The resistance of this wheat to diseases, reported by M. SCHRIEBAU (1) was confirmed, the author finding very few plants attacked by rust, and none by smut. In one field, near the Morzine-Montriond road, however, he found twelve out of about sixty ears he examined to be attacked by rye ergot (*Claviceps purpurea* [Fr.] Tul.). This fungus is very rarely found on wheat, although it has long been known to attack graminæ other than rye.

The ergot observed was very characteristic but differed from that found on rye in its length, 10 to 18 mm., breadth, 3 to 6 mm., and early and stable furrow, sometimes causing one or more lobes, and its more compact texture. The morphology of this ergot probably depends on its habitat, and its composition differs fairly widely from that of rye ergot. According to the author it should be put in a class quite distinct from that of rye ergot under the name of *Cl. purpurea* f. *Tritici* or f. *Tritici-Manitobae*, until its germination and resultant reproduction organs have been studied. Infection experiments should be made with the ascospores on rye to see whether the transition from rye ergot to wheat ergot is as easy as supposed.

There is no cause for alarm, Manitoba wheat being so slightly attacked by this parasite. Nevertheless the author thinks ergot may be more easily acclimatised on this Canadian wheat than on the old varieties, and that it would be wise to begin immediately the control of seed supplied to farmers. The author found no sign of ergot on the graminæ next to the infected field, not even on rye.

II.—M. FOURRIER, Director of the Agricultural Service of Upper Saône also reports the rareness of ergot on wheat. Nevertheless, in 1918, he found it in Upper Saône in abundance on Alsatian buckwheat, a variety largely grown in this department and most of north eastern France. This seems to show that the parasite attacks the native varieties as well as Manitoba wheat.

137—**Apple Bitter Rot and its Control.**—ROBERTS, J. W. and PIERCE, I., in the *U.S. Department of Agriculture, Farmers' Bulletin* 938, pp. 1-14, Washington, April, 1918.

Apple bitter rot, caused by *Glomerella cingulata*, is especially severe in Arkansas, southern Missouri and southern Illinois, where the hot summer and moisture favour the development and spread of the disease. The first signs of the disease are the appearance of light brown, sometimes almost colourless spots just beneath the skin of the fruit. In a few days the infected areas may attain a diameter of 1 inch. The tissues beneath the spots are rotted and soft. This

(1) See also AGRICULTURAL GAZETTE, February, 1919, page 203, No. 1051.

makes it possible to distinguish bitter rot from black rot, caused by *Sphaeropsis Malorum*. The rotted area may increase in size until the whole apple is involved or it may stop at the first stages, leaving nothing but a cone-shaped cavity covered by hard skin.

The parasite is particularly injurious in its conidial form. The germ tube penetrates into the flesh of the apple and produces mycelium in and between the cells, thus causing disintegration of the tissues. The fungus also produces ascospores which, however, are not of great importance in spreading the disease. The masses of conidia on the surface of the fruit are transmitted to other fruit by insects or rain. At first these masses are mucilaginous and thus the conidia are more easily carried by insects. The fungus, besides affecting the fruit, also causes cankers on the branches of the trees. At the diseased spot the bark dries up and cracks in a characteristic manner.

The two principal agents in the transmission of the disease from year to year are mummified apples full of the fructifications of the fungus, and cankers on the branches which contain an enormous number of spores. The control measures recommended are:—(1) Spraying with Bordeaux mixture so that the fruit is well covered, to prevent the germ tube of the conidia from penetrating the flesh; (2) careful collection and destruction of all mummified fruit; (3) removal of the cankerous branches and sterilization of the cuts with mercuric chloride.

All varieties of apples are not equally subject to bitter rot; they may be divided into four classes;—

(1) Very susceptible:—Corfu, Fallawater, Gibbs, Givens, Highfill, Huntsman, Lansingburg, Smokehouse, Willow, Yellow Newtown;

(2) Moderately susceptible:—Ben Davis, Gano, Grimes, Jonathan, Limbertwig, Missouri, Nero, Northern Spy, Northwestern, Oliver, Paradise, Pilot, Smith, Stark, Winter Queen, York Stripe;

(3) Fairly resistant:—Arkansas, Baldwin, Delicious, Maiden Blush, Rome Beauty, Stayman Winesap, York Imperial;

(4) Slightly susceptible or resistant:—Akin, Arkansas Black, Bismark, Langford, Ralls, Salome, Winesap.

141—The Control of the Clover Flower Midge, in America.—CREEL, C. W. and ROCKWOOD, L. P., in the *U. S. Department of Agriculture, Farmers' Bulletin* 971, pp. 1-12. Washington, June, 1918.

The clover-flower midge (*Dasyneura leguminicola* [Lintner]), lays its eggs in young clover heads. When the larvæ emerge they eat the essential parts of the flower, thus considerably reducing the seed crop. Although no exact data on the geographical distribution of the insect are available, there is no doubt that it is widespread in America. It has been observed in New England for many years. There are three generations a year, but it is the larvae of the second generation which do most damage. The control measures recommended are:—(1) early cutting of the clover; (2) pasturing cattle in infected meadows from the beginning of spring till late in May or early in June.

AGRICULTURAL ECONOMICS

PRESENT POSITION OF FARMERS' CO-OPERATION IN ENGLAND AND WALES (1)

According to the last statistics of the Board of Agriculture there are 423,718 farmers in England and Wales. Of them about 70,000, or one-sixth, belong to some 450 farmers' societies registered under the Industrial and Provident Societies Act. It is estimated that only 3 per cent of all the farmers farm more than 300 acres each, only 13 per cent more than 150 acres, and 50 per cent more than 50 acres. England and Wales are therefore countries of small farmers.

The war has taught the nation that a productive home agriculture is essential to its security. Unless farmers produce the amount of food the nation wants and the kind it wants, they may be forced to submit to a certain degree of State control. Hence

the necessity for organization. By organization it is possible for farmers to protect themselves against undue State control, to prevent occasion for control, to increase their own profits and to improve the quality as well as the quantity of the goods they offer to the consumer.

A brief review of the more important types of agricultural organization in England and Wales may be given here. There are in round figures 250 societies for the purchase of farmers' requisites, 70 egg and poultry societies, 60 fruit societies, co-operative auction societies, etc., 50 dairy societies and 22 credit societies in addition to 540 allotment societies; that is, 992 agricultural societies as against 550 in 1915. The turnover of these societies was roughly \$40,000,000 in 1918 against \$15,000,000 in 1915, and their combined membership was about 155,000, in 1918 and about 55,000 in 1915. Of farmers as apart from allotment societies

¹ Based on articles in the Journal of the Board of Agriculture, December, 1918, by Sir Henry Rew, Assistant Secretary of the Board of Agriculture and Fisheries, and others.

the total membership was, as already stated, 70,000 in 1918 against about 40,000 in 1915. Thus it is clear that the movement for co-operation among farmers has made progress during the war.

Purchase Societies.—Co-operation for the purpose of purchasing requisites is comparatively easy to organize. Most successful societies have begun their activities by buying feeding stuffs, seeds, implements, or other supplies for their members. As a general rule there is nothing which a farmer buys which cannot be bought better by a co-operative society than by himself, for if the society be officially organized its buying is done by an expert. Naturally all local societies cannot supply a specialist for every kind of supplies, but they can secure this service by federating.

Selling Societies.—These societies benefit the farmer by making sure that he secures all the profits due to him. On the other hand they benefit the consumer by guaranteeing the quality and condition of the produce they sell. Hitherto, in England and Wales, milk has been sold co-operatively more than any other product of agriculture, probably because the advantages of a common collecting, cooling and selling of milk are obvious. In the summer of 1918 the dairy societies dealt with about 150,000 gallons of milk a day. The co-operative selling of fruit and vegetables also made good progress, the necessity for the careful packing and grading of market-garden produce which is to sell well being recognized. Co-operative societies have also been active in collecting and selling eggs and poultry. One such society, the Auction Markets at West Bournemouth and Boscombe, has collecting depots for vegetables and fruit in a large number of villages. A motor lorry collects the produce of the small growers, and this is put up for auction and sold the day after collection. Prices to consumers are less than shop prices, and prices to growers more by from 30 to 60 per cent than those obtained elsewhere.

Societies Treating Agricultural Produce.—Co-operation can enable farmers to retain control of their produce after it has passed beyond the stage of raw material, and therefore to receive profits which ordinarily go to others. There are, in England and Wales, a considerable number of farmers' co-operative societies which subject produce to the processes necessary to prepare it for consumption. Thus five co-operative slaughter-houses are fully at work. It is however in the manufacture of the derivatives of milk that co-operation has been most important.

An interesting experiment was made in 1914 when the Board of Agriculture in conjunction with the Cornwall County Education authorities established a co-operative cheese school at Lostwithiel. Its object was to prove to farmers the advantages of a co-operative factory, and

also to give instructions in cheesemaking under factory conditions. The experiment was so successful that nine similar schools were at work in 1917 and eighteen in 1918. In 1917 the nine schools sold 168,000 pounds of cheese. They instructed 85 pupils, some of whom afterwards found employment as cheesemakers.

As regards the best form of agricultural co-operation, authoritative opinion is divided. Sir Henry Rew of the Board of Agriculture writes that the "tendency both at home and abroad, for co-operative associations to be specialized, i.e. to confine their operations to a particular kind of produce, appears to continue, and probably affords the best, if not the only means, in most cases, of getting the co-operative principle accepted in a district, leaving the linking up of specialized societies to a later stage of development." The contrary opinion is expressed by Mr. F. D. Acland. "Societies now specialized should become general purpose societies. With whatever primary purpose a society is formed it should have its agricultural store, its credit and banking department, its small produce department, its land owning or renting department. But there should be more than these forms of organization for profit. Its more important department should be that of the public good. It should promote village and home industries so as to give interesting work for women. It should make our hedges bear fruit trees rather than thorns and see that this, and other communal property is respected. It should be able out of its profits, almost without feeling the burden, to build village halls and recreation rooms, to start libraries and reading rooms, to run a cinema." Mr. Leslie Scott, while taking a narrower view of the duties of a co-operative society, yet does not advocate too much specialization. "Here in England and Wales we have found that the kind which serves our need best is the large society, covering a considerable area and conducting more than one type of business. There may be several sides to such a society's work."

As regards the particular kind of business which should be the object of further co-operative effort, it is urged in particular:—

(1) That there should be many more co-operative slaughter-houses, the present number being multiplied even a hundredfold; this would give the farmers a fair chance to compete with the importers of foreign meat.

(2) That there should be a multiplication of agricultural credit societies. As stated in the article in the *International Review of Agricultural Economics* for January there were only 48 agricultural credit banks in England and Wales in 1916 as compared with 279 in Ireland.

(3) That it should be an integral part of the work of all societies to help to keep their members' accounts and to determine the costs of production.

(4) That all dairy societies should undertake milk recording, the systematic inspection of dairy herds and the elimination of bad bulls; and that dairy societies should handle a far larger proportion of the country's milk supply than they do at present.

(5) That producing societies should adopt the methods of the Irish Creamery Butter

Control, that is they should institute trademarks which would be applied only to goods produced well and in sanitary conditions and would therefore be a guarantee of quality.

(6) That agricultural implements and, in particular, motor tractors should be co-operatively bought and owned.

CONTENTS OF THE INSTITUTE ECONOMIC BULLETIN

The following is a list of the more important subjects treated in the January-February number of the International Review of Agricultural Economics. Persons interested in

any of the articles in this list may obtain the original bulletin on application to the Institute Branch, so long as the supply for distribution is not exhausted.

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AGRICULTURAL STATISTICS

ACREAGE OF CEREALS 1918-19

Countries.	1919.	1918.	Five years' average 1913 to 1917.	1919 compared with 1918.	1919 compared with 5 years' average.
	Acres.	Acres.	Acres.	%	%
WHEAT--					
Alsace-Lorraine	167,000		322,000		51.7
Denmark	125,000	141,000	143,000	88.8	87.6
Spain	11,317,000	10,230,000	9,970,000	110.6	113.5
France	11,087,000	11,360,000	13,251,000	97.6	83.7
England and Wales	2,400,000	2,537,000	1,902,000	96.0	128.0
Scotland	70,000	79,000	63,000	88.5	110.8
Greece	937,000				
Italy	10,502,000	10,798,000	11,625,000	97.3	90.3
Canada	16,959,000	17,354,000	13,309,000	97.7	127.4
United States	71,526,000	59,110,000	52,490,000	121.0	136.3
India	23,415,000	35,497,000	30,851,000	66.0	75.9
Japan	1,362,000	1,458,000	1,287,000	93.4	105.8
Totals less Alsace-Lorraine and Greece.	148,763,000	148,564,000	134,891,000	100.1	110.3
—					
Alsace-Lorraine.	130,000		130,000		
Denmark..	555,000	537,000	531,000	103.3	104.5
Spain.....	2,493,000	1,818,000	1,855,000	137.1	134.4
France.....	1,814,000	1,955,000	2,322,000	92.8	78.1
England and Wales.	98,000	103,000	52,000	95.0	189.0
Greece.....	59,000				
Italy.....	272,000	272,000	292,000	93.1	93.1
Canada.....	576,000	555,000	143,000	103.8	402.8
United States	6,484,000	6,185,000	3,108,000	104.8	208.6
Totals less Alsace-Lorraine and Greece	12,292,000	11,425,000	8,303,000	107.6	148.0

ACREAGE OF CEREALS 1918-19—Concluded

Countries.	1919.	1918.	Five years' average 1913 to 1917.	1919 compared with 1918.	1919 compared with 5 years' average.
	Acres.	Acres.	Acres.	%	%
BARLEY—					
Spain.	5,728,000	4,210,000	3,791,000	136.1	151.1
France.	256,000	249,000	322,000	102.7	79.4
Greece	299,000				
Italy.	469,000	494,000	580,000	95.0	80.9
Canada	3,036,000	3,154,000	1,804,000	96.3	168.3
United States	8,899,000	9,679,000	7,761,000	91.9	114.7
Japan	2,931,000	2,721,000	3,046,000	107.7	96.2
Totals less Greece	21,319,000	20,507,000	17,304,000	104.0	123.2
OATS—					
France	1,652,000	1,711,000	1,831,000	96.6	90.2
Greece	156,000				
Italy	1,112,000	1,211,000	1,173,000	91.8	94.8
Canada	14,654,000	14,790,000	11,272,000	99.1	130.0
United States.	42,365,000	44,400,000	40,587,000	95.4	104.4
Totals less Greece	59,783,000	62,112,000	54,863,000	96.3	109.0
FLAXSEED—					
Italy	45,000	42,000	44,000	105.9	101.2
India	1,841,000	2,932,000	3,462,000	62.8	53.2

FOREIGN CROP PROSPECTS

(From Broomhall's Corn Trade News.)

Great Britain and Ireland.—A prolonged period of dryness has caused considerable damage. There are fears of a light hay crop. Many complaints of the condition of oats and barley have been received. Latest advices show that the long hoped-for rain came, but more precipitation would be helpful.

France.—On June 1st growth was nearly up to normal. In the middle of June the country was beginning to suffer from drought and the official condition of growing crops was about fair.

Germany.—At the end of May grain crops were reported to be up to the average as regards condition.

Spain.—On June 1st the weather was fine and crops promised well. Later excellent rains fell and improved the prospects of the wheat crop considerably. General indications pointed to a good crop. Harvest outlook is bright.

Greece.—Crop prospects were bad on June 1st.

Italy.—On June 1st reports of the wheat and corn crops continued favourable. In

the middle of June good harvest prospects for wheat were still maintained. An outturn of 188,000,000 bushels of wheat against 176,000,000 last year is expected.

Roumania.—In the first part of June the weather was not favourable and the yield of wheat was uncertain. It was hoped that the crops would yield sufficient for home consumption.

Bulgaria.—Early in June the outturn of wheat was expected to be moderate. Bad weather had delayed the harvest for a fortnight.

North Africa.—Harvest prospects are fairly good generally, although there have been some untimely rains.

Australia.—The drought was broken late in May, and further good rains fell during the first part of June. A reduction in the wheat acreage is expected.

Argentina.—The weather was fine and favourable for the new crops in the first part of June.

UNITED STATES JUNE CROP REPORT

The United States Department of Agriculture makes the following estimates from the reports of its correspondents and agents of the crops on June 1st.

Products.		Estimated production 1919.	Final Figures 1918.	Average 1910-1914.
Wheat	Bushels	1,236,003,000	917,100,000	728,225,000
Oats	"	1,446,031,000	1,538,359,000	1,157,961,000
Barley	"	231,757,000	256,375,000	186,208,000
Rye	"	107,381,000	89,103,000	37,568,000
Hay	Tons	115,907,000	90,443,000	81,640,000
Apples	Bushels	166,334,000	173,632,000	197,898,000
Peaches	"	50,348,000	39,149,000	45,842,000
Pears	"	12,298,000	10,342,000	11,184,000

IMPORT AND EXPORT OF WHEAT AND FLOUR

(Flour expressed in equivalent quantities of wheat)

(Thousands of Bushels)

Countries	Imports.				Exports.			
	March.		First 3 months (Jan. 1 to Mar. 31)		March.		First 3 months (Jan. 1 to Mar. 31)	
	1919.	1918.	1919.	1918.	1919.	1918.	1919.	1918.
Great Britain and Ireland	5,765	10,314	30,591	30,527	54	31	115	98
Italy	5,221	5,914	17,931	13,477	148	31	311	59
Sweden			726				55	
Canada	5	10	13	16	6,766	13,500	21,078	31,566
United States	3	419	1,231	8,536	11,219	12,208	49,164	35,144
India	2,061		2,061		153		447	
Japan	143	19	437	34		442		1,660
Tunis	1		4		431	13	493	41

LIVE STOCK STATISTICS

DENMARK.

Numbers of pigs in Denmark according to the Census of February, 1919.

Classification.	Feb. 10, 1919.	Dec. 10, 1918.	Sept. 10, 1918.	Feb. 5, 1918.	July 15, 1914.
Boars over 4 months	4,008	3,957	4,723	6,006	12,663
Sows over 4 months	70,320	65,614	80,916	77,792	282,750
Fattening pigs over 4 months	201,526	255,940	161,994	184,943	706,950
From 2 to 4 months	209,757	260,819	249,400	201,158	1,494,343
Under 2 months	97,755	140,514	255,678	43,113	
Totals	583,366	726,844	752,711	513,012	2,496,706

ITALY.

Provisional estimates of the general census of live stock in Italy taken on April 7, 1918.

Classification.	Apr. 7, 1918.	Mar. 19, 1908.	1914.	Increase (+) or decrease (-)	
				Differences.	Percentages 1908 = 100.
Horses	804,168	955,878	2,235,000	- 151,710	- 15.9
Asses	944,611	849,723		+ 94,888	+ 11.2
Mules	308,875	388,337		- 79,462	- 20.5
Cattle	6,162,259	6,198,861	6,646,000	- 36,602	- 0.6
Buffaloes	24,014	19,366		+ 4,648	+ 24.0
Pigs	2,337,304	2,507,798	2,722,000	- 170,494	- 6.8
Sheep	11,751,575	11,162,926	13,824,000	+ 588,649	+ 5.3
Goats	3,082,554	2,714,878		+ 367,676	+ 13.5

SWEDEN.

Classification.	June 1, 1918.	June 1, 1917.	Increase (+) or decrease (-)	
			Differences.	Percentages (1917 = 100)
Horses	714,822	715,101	- 279	-
Cows	1,634,982	1,775,353	- 140,371	- 7.9
Other Cattle	949,177	1,245,028	- 295,851	- 23.8
Sheep	1,409,473	1,344,202	+ 62,271	+ 4.9
Goats	133,304	135,690	- 2,386	- 1.8
Pigs	633,862	1,029,967	- 396,105	- 38.5
Poultry	4,774,566	6,034,717	- 1,260,151	- 20.9
Turkeys	4,050	5,167	- 1,117	- 21.6
Geese	17,530	17,047	+ 483	+ 2.8
Ducks	14,600	23,179	- 8,579	- 37.0
Bechives	133,535	140,878	- 7,343	- 5.2

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DEPARTMENT OF AGRICULTURE

The Agricultural Gazette of Canada

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OF CANADA

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THE EFFECT ON AGRICULTURE OF CO-OPERATIVE BUYING AND SELLING

THE belief that "competition is the life of trade" is gradually losing favor in most agricultural districts in Canada. From the study of official reports we find that in Canada, as in Europe, the agricultural industry is making greatest advances in those districts where co-operative merchandizing is practised by the farmers. In *The Agricultural Gazette* for May co-operative buying and selling, as it exists in most of the provinces, was discussed, and in the July issue the co-operative marketing of live stock was dealt with from a Dominion-wide view point. In this issue the effect on agriculture of co-operative buying and selling is presented by men who are actively engaged in co-operative work. The co-operative principles, which have given greatest satisfaction in other lands, are being adopted in many rural districts of Canada to the betterment of these communities.

The direct financial gains made by farmers are not the prime argument in favour of co-operation. Its most considerable effect has been on the mental attitude of the members of the community. In co-operative neighbourhoods farmers work together in harmony and take a keen interest in each others welfare. This spirit of mutual help is the father of the community movement which is becoming very noticeable throughout the best agricultural sections of Canada. The individual members of co-operative societies are assuming personal responsibility and, in raising produce for market, are observing the requirements of uniformity and quality advocated by the organizations, as though the business were their own. This is different from their attitude under the old system of selling to the highest bidder.

Rural communities organized co-operatively need not worry about finding markets for their produce. Buyers are eager to transact business with them on account of the standards they maintain. The general air of prosperity and thrift existing in their midst attracts the best class of agriculturists to search for farms in such communities. Hence intelligent methods of production are adopted, land values are increased, and contentment in the industry is assured. The competitive dealings of a decade ago are losing ground, while loyal co-operation is bringing about fuller development of agriculture. The "lean kine" of competition have been devastating our resources and swallowing up profits, but it appears that the "well-favoured kine" of co-operation are soon to assert themselves, establishing contentment and prosperity where agricultural activities are carried on in harmony and unison.

FEDERAL LEGISLATION

AT the recent session of the federal Parliament a number of measures closely related to the agricultural industry were enacted. These include amendments to The Live Stock and Live Stock Products Act, The Soldier Settlement Act, The Seed Grain Act, The Canada Highways Act, The Reclamation Act, and The Fertilizers Act.

AN ACT TO AMEND THE LIVE STOCK AND LIVE STOCK PRODUCTS ACT

Amendments to *The Live Stock and Live Stock Products Act of 1917* extend the rights of farmers to buy as well as sell animals at a public stock yards, provides for the inspection as well as grading and branding of products, including wool, and increases the indemnity for violation of the act. Following are the sections affected in the amended form:

3—(2) Nothing in this act, or in any regulation made hereunder, shall take away, or in any manner limit, the right of any farmer, drover, or other person to sell live stock at any stockyard, or the right of any farmer, drover, or other person to buy live stock at any stockyard."

9—The Governor-in-Council may make regulations prescribing:

(c) The manner in which live stock, meat, poultry, eggs, and wool shall be inspected, graded, branded, or marked, and what shall be the size of packages containing meat, eggs, poultry, and wool, the kind of package that may be used, and how such packages shall be branded, marked, or labelled."

(d) the manner in which live stock products imported into Canada shall be inspected, graded, branded, or marked."

9A—(1) No person shall offer or accept for shipment or shall ship any live stock or live stock products subject to inspection or branding or marking under this act unless the requirements regarding inspection and branding or marking have been complied with and the certificates mentioned in this section have been issued.

(2) Inspectors shall issue certificates for all live stock or live stock products inspected and approved or branded or marked by them. Such certificates shall be in such form as may be prescribed by regulation.

10.—Any person violating any provision of this Act, or of any regulation shall be liable on summary conviction to a fine not exceeding four hundred dollars, or to imprisonment for a term not exceeding three months, or to both fine and imprisonment.

THE SOLDIER SETTLEMENT ACT

Under *The Soldier Settlement Act, 1919*, the Soldier Settlement Board has power to grant financial assistance to discharged soldiers or sailors of the Canadian, Imperial, or Colonial Forces who served out of Canada and to residents of Canada before the war who served with Allied armies in a theatre of war. This assistance is in the form of a loan up to a maximum of \$7,500, \$4,500 for the purchase of land in any province, \$2,000 for livestock, implements, and other equipment, and \$1,000 for permanent improvements.

To settlers on Dominion lands in the Prairie Provinces, the board may loan up to \$3,000 according to the value of the security, and to settlers who already own their own land up to \$5,500, \$2,500 for the discharge of incumbrances, \$2,000 for livestock and implements, and \$1,000 for improvements. These loans, except for livestock and implements, are repayable in twenty-five equal annual instalments. The equipment loans are repayable in four equal annual instalments beginning the third year, no interest being charged the first two years. The interest rate on all loans is five per cent.

An important section of the act provides for the expropriation of lands. The board may declare a "settlement area" where lands are being retarded from agricultural development and may possess the land by Exchequer Court proceedings.

With regard to Dominion Crown Lands, all such within fifteen miles of a railroad are reserved for soldier settlement. A soldier settler may secure 160 acres as a free soldier grant

entry in addition to his civilian right of homesteading 160 acres.

Provision is made for agricultural training for men lacking experience but who are regarded as suitable men to take up farming. The board may provide for training at training centres specially equipped and afterwards settlers may be placed with experienced farmers who will pay them wages. While the soldier is acquiring practical experience he is paid subsistence allowances for himself and dependents. These allowances amount in some cases to \$55 a month. The bill appropriates \$25,000,000 for the carrying out of this work.

THE SEED GRAIN ACT OF 1919.

The Seed Grain Act of 1919 provides a means of furnishing seed grain to the holders of unpatented land, who have suffered loss of crop through one cause or other, and places the distribution not only on a more economic basis but also gives the person receiving the advance the privilege of securing the variety of seed best suited for his purpose and from whatever source he desires. The act also makes provision that these advances shall be made by the chartered banks of Western Canada, and guaranteed by the Dominion government.

The method of procedure specified by the act is as follows:--

The party desirous of securing an advance makes application to the secretary-treasurer of the municipality, in which he is located, or if the district is unorganized, to the local officer of the provincial Department of Agriculture. This officer, before accepting the application, verifies the facts as to the number of acres under cultivation and also satisfies himself that if aid is not given the land will go unseeded. He then forwards the application to the agent of Dominion lands of the district, who reports on the standing of the entry and recommends or otherwise the granting of the

advance. He in turn forwards the application to the chief inspector of Dominion land agencies, who, if finding same in order, approves the advance and forwards to the bank named by the applicant the necessary liens. The bank takes the usual note, bearing seven per cent interest, payable on the first of January of the year following the advance, and in addition has the lien executed for the protection of the Dominion government. The bank then issues the order for the seed on the person or persons named by the applicant. This order is negotiable in any chartered bank in Canada.

The collection of these notes remains in the hands of the banks, who receive a commission of one per cent on all the amounts they collect.

THE CANADA HIGHWAYS ACT.

The Canada Highways Act was designed to promote and assist the building and improving of highways throughout the different provinces of the Dominion. It provided for the payment to the provinces of \$20,000,000 out of the consolidated revenue fund, for a period of five years beginning April 1, 1919. The payments are to be as follows: \$80,000 each year to the government of each province; the remainder of such sum to the provinces to be in proportion to their respective populations as determined by the last federal census. The following are the conditions on which these payments are made: Any highway for which money is granted to be constructed or improved in accordance with the terms of an agreement made between the Minister of Railways and Canals and the government of the province receiving the money, which shall contain provisions as to cost, description, specifications, etc., the aid to be granted shall be 40 per cent of the amount of the actual and necessary cost of the work in question.

THE RECLAMATION ACT

The enactment of *The Reclamation Act* during the past session of Parliament, and the recent promulgation of drainage regulations and creation of a new branch of the departmental service known as the 'Reclamation Service', marks the successful conclusion of negotiations carried on for several years between the Dominion government and the governments of the provinces of Alberta and Saskatchewan for the reclamation of submerged or swamp lands by drainage, and paves the way for a progressive policy whereby large areas of now worthless land in these provinces may be reclaimed and made productive.

The problem presented by drainage in these provinces was peculiar: The ownership and control of all sources of surface water supply, including lakes, marshes, etc., is vested in the Dominion government which also owns the unalienated public land, while control of the drainage of land is vested in the provincial governments. This divided jurisdiction had invited controversy and had seriously interfered with the reclamation of submerged or swamp land and with the construction of roads, and, generally had exercised a retarding effect upon the settlement and development of the districts comprising any considerable areas of such land.

The present arrangement is in the nature of a compromise of the apparently conflicting interests. Where drainage districts are organized in accordance with provincial laws the Dominion Government will, under certain conditions, transfer to the province at a nominal price any vacant Dominion lands within such districts in order that such lands, when reclaimed, shall be assessable for their fair share of the cost of their reclamation. On the other hand, the provincial governments will, when the Dominion government desires to

take the initiative in the construction of drainage works, place at the disposal of the Dominion all their legislative machinery, upon the condition that the lands when reclaimed shall be sold at public auction, and that the purchasers shall thereafter become responsible for the maintenance of the drains, in the same manner as if the works had been initiated by the settlers themselves under provincial laws.

THE FERTILIZER ACT

The amendment to *The Fertilizer Act of 1909*, stipulates that each package of fertilizer sold must be labelled with brand name, registration number, guaranteed analysis, stating separately in minimum percentages only (a) the percentage of nitrogen, (b) the percentage of available phosphoric acid and total phosphoric acid, (c) the percentage of potash soluble in water, and also the name and address of the manufacturer or agent.

In the case of bone meal, tankage, or other organic products, and basic slag, the phosphoric acid shall be stated as total phosphoric acid unless it be desired to state available phosphoric acid also. When leather in any form, wool waste, hair, or any inert organic nitrogenous material, forms part of any fertilizer, the percentage of such ingredient must be mentioned in the guaranteed analysis, unless by processing the nitrogen has been made available in such materials. When potash is derived from sulphate of potash or carbonate of potash, it may be so stated in the guaranteed analysis.

The act further provides that every brand of fertilizer offered for sale in Canada shall bear a registration number secured from the Minister of Trade and Commerce and also provides for the licensing of dealers in fertilizer products. The penalty for violation of the act shall not exceed \$100.

APPROPRIATIONS FOR AGRICULTURE.

	1919-20	1918-19
Experimental Farms—maintenance of Central Farm, and establishment and maintaining of additional branch Stations.....	\$ 1,200,000	\$ 1,012,036.60
Branch of Entomology.....	18,000	22,000.00
For the administration and enforcement of the Destructive Insect and Pest Act.....	149,200	134,400.00
For the development of the dairy industry, and the improvement of transportation, sale and trade in food and other products.....	155,000	155,000.00
Towards the encouragement of cold storage warehouses for the better preservation and handling of perishable food products.....	25,000	25,000.00
Fruit Branch.....	122,500	127,715.00
Health of Animals.....	465,000	415,000.00
For the administration and enforcement of the Meat and Canned Foods Act.....	442,000	379,000.00
Publications Branch.....	36,300	30,000.00
International Institute, of Agriculture to assist in maintenance thereof and to provide for representation thereat.....	10,000	10,000.00
For the development of the live stock industry.....	800,000	600,000.00
To enforce the Seed Act, to test seeds for farmers and seed merchants, to encourage the production and use of superior seeds, and to encourage the production of farm and garden crops.....	200,000	165,000.00
For the administration and carrying out of the provisions of The Agricultural Instruction Act.....	25,000	25,000.00
	<u>\$ 3,648,000</u>	<u>\$ 3,100,151.60</u>

AUTHORIZED BY STATUTE.

The Agricultural Instruction Act.

Ontario.....	\$ 336,303.26	\$ 336,303.26
Quebec.....	271,113.76	271,113.76
Nova Scotia.....	81,716.69	81,716.69
New Brunswick.....	64,110.80	64,110.80
Prince Edward Island.....	31,749.22	31,749.22
British Columbia.....	69,199.06	69,199.06
Manitoba.....	77,113.11	77,113.11
Saskatchewan.....	81,728.48	81,728.48
Alberta.....	66,965.62	66,965.62
Veterinary Colleges.....	20,000.00	20,000.00
	<u>\$ 1,100,000.00</u>	<u>\$ 1,100,000.00</u>

SUMMARY.

Voted.....	\$ 3,648,000.00	\$ 3,100,151.60
Authorized by Statute.....	1,100,000.00	1,100,000.00
	<u>\$ 4,748,000.00</u>	<u>\$ 4,200,151.60</u>

PART I

Dominion Department of Agriculture

DAIRY AND COLD STORAGE BRANCH

*COLD STORAGE FACILITIES IN CANADA.

BY J. A. RUDDICK, DAIRY AND COLD STORAGE COMMISSIONER.

THERE should be ample storage facilities for the handling of dairy produce and meats in the localities where these articles are produced. The abattoirs of the country provide their own facilities for the chilling or freezing of meats as the animals are slaughtered. The largest cheese factories and creameries are also fairly well equipped in this respect. There is also required good refrigeration car services with a sufficient number of cars of the right type to carry the products in proper condition. For the export meat trade there is also required terminal warehouses where refrigerator cars may discharge their freight close to the ocean berths. We also require suitable refrigerator space on the steamers if our overseas trade in perishable food products is to be fully developed.

COLD STORAGE WAREHOUSES.

There are about 190 cold storage warehouses in Canada. All of these warehouses are equipped with mechanical refrigeration, except a few very small ones in which the crushed ice and salt system of refrigeration is used. Not including the smaller plants used in connection with retail shops, we have in Canada a total of 26,958,411 cubic feet of refrigerator space. There are also quite a large

number of smaller private storages running from about 2,000 cubic feet to as high as 20,000 cubic feet capacity. These provide about 758,000 cubic feet of space making a total of 27,717,211 cubic feet available for cold storage of meat, fish, dairy, and other products.

REFRIGERATOR CARS.

The several railways of Canada have a combined total of 4,459 refrigerator cars, made up as follows:

Railways	Ordinary Brine	
	cars	tank cars
Canadian Pacific	504	1,931
Grand Trunk	965	200
Grand Trunk Pacific	39	195
Canadian National	*625	

Total 4,459

*Kind not specified.

The Canadian Pacific Railway has also 100 cars equipped for use on express trains.

TERMINAL WAREHOUSES

The cold storage warehouses at Montreal, Que., and other places fill the requirements to some extent. They meet the needs of the dairy produce trade fairly well except in the matter of economical handling. A large cold storage warehouse now under construction by the Harbour Commissioners at Montreal will be

*Summary of an Address before the Select Standing Committee of the House of Commons on Agriculture and Colonization.

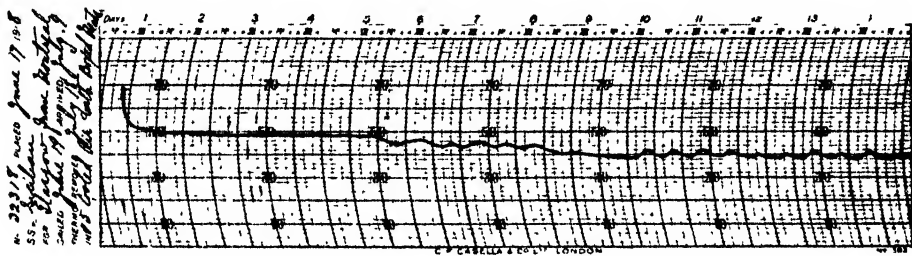
situated on the docks, will have track connections with all the railways, and will have at least one steamer berth where goods can be loaded direct. The location is very central being close to present produce district. Provision will be made for unloading directly from the cars into the warehouse and from the warehouse direct to the steamers. This warehouse will have a total capacity of 2,000,000 cubic feet and will cost in the neighborhood of \$1,500,000.

OCEAN REFRIGERATION

Until overseas transportation becomes normal again there may be some shortage in refrigerated space for trans-atlantic shipments. Before

The shortage is accounted for by the sinkings by submarines and the present use of boats carrying large accumulations of meats and dairy produce from Australia and New Zealand.

The Department of Agriculture, through the Dairy and Cold Storage Branch, undertakes the inspection of refrigerated cargo on ocean steamships sailing from Canada. This service has been in operation since 1900. A number of inspectors are stationed at Montreal to watch ships being loaded with perishable products chiefly of those kinds that are carried in refrigerated space. Thermographs are placed in different parts of the ship where perishable products are carried. These instruments auto-



THERMOGRAPH RECORD

Note the sudden fall in temperature the first few hours and the uniformity maintained during the voyage, as indicated by the black line crossing the chart carried with a cargo of boxed meats from Montreal to Glasgow.

the war there were forty-five steamers with refrigerated space sailing from Canadian ports to the United Kingdom and four to South Africa, with a total refrigerated capacity of 1,072,476 cubic feet. There were also eighteen steamers equipped with 800,000 cubic feet of cool air space suitable for cheese, bacon, and apples. For the current season the indications are that there will be only twenty steamers as against forty-five going to the United Kingdom and one against four to South Africa, having a total refrigerated capacity of 375,212 cubic feet of space which is less than one half of what was available before the war. Ten steamers are equipped with cooled air compartments with a total of 159,800 cubic feet capacity as against 800,000 cubic feet before the war.

matically record the temperature continuously during the voyage. When a ship arrives at a United Kingdom port another inspector secures the charts and thermographs and returns them to Montreal. Copies of the charts are made available to any person interested in the shipments. The Dairy and Cold Storage Branch has records covering practically every shipment that has been made for the last twenty years.

COLD STORAGE SUBSIDIES

Under the Cold Storage Act, 1907, subsidies equal to 30 per cent of the approved cost of public cold storage warehouses have been paid in instalments covering a period of four years. Altogether some 34 warehouses, with a total refrigerated space of 4,926,304

cubic feet, have been given subsidies under this Act. The total cost of these warehouses was \$2,408,354. The subsidies actually paid amounted to \$690,640. Instalments have, in some cases, been withheld for non-fulfilment of contracts, while some instalments are not yet due. When these are all paid the department will have contributed \$722,506.41 as subsidies to cold storage plants.

By an Order in Council dated May 26, 1919, the policy was adopted of paying subsidies in future only on warehouses erected and operated by municipalities or other governing bodies.

CREAMERY COLD STORAGE BONUSES

There is also a plan of paying bonuses of \$100 to creameries that erect suitable cold storages in connection with the creamery plant. This is paid only once to any creamery.

ICED CAR SERVICES

For many years the Department of Agriculture has made arrangements with the railway companies to put on an iced car service for the carriage of butter and also for the carriage of cheese during the warm months. The arrangement for the butter cars is that they are run over certain routes at stated times and on stated days to pick up small lots of butter at every station. The department guarantees two-thirds of the earnings of a minimum carload from the starting point to destination plus

\$6 per car for icing. The shipper pays ordinarily less than carload rates on his butter. When the earnings amount to more than the guarantee there is no charge and it works out that on a great many of the cars there is nothing paid at all by the department.

With the iced cheese car service the department pays an icing charge of \$6 per car for shipments of cheese in car lots. The shipper orders the car wherever he wants it and the department accepts the bills from the railways covering a limited number of cars per week during a certain period of warm weather. These services have been in operation for many years and this year the cars thus used are run on different routes leading to Montreal, Toronto and other centres. Refrigerator car inspectors are employed under the Dairy and Cold Storage Branch to examine the ice bunkers and otherwise observe the conditions in the refrigerated cars at the terminals to see that a proper service is maintained. They also make reports on the quantities carried which are checked up against the railway companies' accounts as presented for payment under the guarantee.

SMALL COLD STORAGES

The Dairy and Cold Storage Branch published plans and specifications for small storages cooled with ice only. These are suitable for country homes, hotels, butcher shops, and produce stores.

MARKETING SERVICES

BY J. A. RUDDICK, DAIRY AND COLD STORAGE COMMISSIONER

THE services performed by the Dairy and Cold Storage Branch to facilitate the marketing of dairy produce may be summarized as follows:—

On Monday of each week a Dairy Produce Market Report is issued covering the prices paid for butter and cheese delivered at Montreal and

Toronto. This weekly letter is sent regularly free of charge to any person or firm who asks to have their name placed on the mailing list, but it is only forwarded on direct application. In addition to the prices quoted for Montreal and Toronto markets, quotations are given for the New York market, and the report also includes

items of interest in connection with the development and re-establishment of the dairying industry in European countries, conditions of the market in Great Britain for butter and cheese, and something of the state of the industry in the countries that compete with Canada in the export markets. The report also contains the receipts of butter and cheese at Montreal, with comparison with last year, and the exports from the port of Montreal to Europe.

On Mondays and Fridays of each week a prepaid night letter is telegraphed to the secretaries of the various dairymen's associations in each province from Prince Edward Island to British Columbia, quoting prices for butter and cheese as established at Montreal and Toronto on those days. The above officials have arranged to promptly distribute the

information contained in these telegrams among those interested. In addition a night letter is sent direct to any person or firm who agrees to pay the cost of the telegram. A fair number of persons are receiving these telegrams now at their own expense.

TRANSPORTATION IMPROVEMENT.

Besides the market information referred to, indirect assistance towards the sale of Canadian butter and cheese is afforded by the branch through the work it is doing for the improvement of transportation facilities on railways in Canada, on ocean steamers plying between Canada and Great Britain and at ports in Great Britain. These several services are enumerated and described in the foregoing article by Mr. Ruddick on "Cold Storage Facilities in Canada."

ENTOMOLOGICAL BRANCH

THE EUROPEAN ELM SAWFLY LEAF-MINER

BY R. N. CHRYSTAL, FIELD OFFICER, DIVISION OF FOREST INSECTS

THE presence of this insect in Canada was first discovered in July, 1915, when a specimen of its work was sent into the Entomological Branch, by Professor W. A. MacClement of Queen's University, Kingston, Ont., who reported severe damage to elm in two localities near that city. Its presence was again discovered on June 10, 1919, and a more detailed search has resulted in the following account of the life-history and means of control.

Historical.—The first record of this insect in America was made by Dr. E. P. Felt, in 1898, who found it unusually destructive on Albany and Troy, N.Y., that season, the English, Scotch and American elms all being cited by him as host trees. In July, 1899, Professor M. V. Slingerland, Cornell University, Ithaca, N.Y., received blistered leaves of a Camperdown elm, attacked by some leaf-miner, but the larvæ were shrivelled

up and un-recognizable, and it was not until 1903 that the pest was finally identified as the elm sawfly of Europe, *Kaliosysphinga ulmi* Sund., a common but rarely very destructive pest in England, Scotland and throughout Europe.

Slingerland* recorded this species as being very injurious to elms, principally the Scotch and English species at Ithaca, N.Y., and he published an account of its life-history.

A recent investigation made by the writer to ascertain the extent of damage being done by this pest in the city of Kingston and environs, has revealed its presence in a few localities, mainly on the Camperdown variety of Scotch elm, the American elm not being attacked.

The Adult.—The adult insect is a small, shining, black sawfly, about

*Bull. 223, Agr. Exp. State Coll. of Agr., Cornell Univ., Oct., 1905.

3 mm. in length, with four wings, the front pair of which have an expanse of about 8 mm. The term "sawfly" refers to the ovipositing apparatus of the female which is in the form of a saw, this being used to cut holes into the elm leaf, in which the eggs are laid.

The Larva.—The full grown larva measures about 7 mm. in length, and is yellowish-white in colour; the head is much flattened, with the mouth parts brownish in colour; the body tapers slightly posteriorly; the first six thoracic legs are three-jointed, annulated with dark brown; rudimentary prolegs are present on segments 5 to 12.

Life-history.—The life-history as studied by Slingerland is as follows: About the middle of May the adult sawflies begin to appear upon the elm leaves, and lay their round, milky-white eggs. The egg is about .3 mm. in diameter, and is inserted into a hole cut into the leaf, by the saw-like ovipositor of the female. The eggs hatch in about a week and the young larvæ commence burrowing into the leaf, as many as 25 mines have been found in a single leaf. The larval life is of about three weeks' duration. By the beginning of July, practically all the larvæ have completed their growth. When full grown they cut a hole into the skin of the leaf forming the wall of their mine, and drop to the ground, where at a depth of one inch or less they construct a thin, brown, papery cocoon in which they hibernate, as larvæ, until the next April, and change to pupæ about the beginning of May. There is apparently only one generation a year, in contradistinction to its near relative the Alder Sawfly Leaf-miner, *K. dohrnii* Tisch., which has several.

From observations made at Kingston on the life-history the following may be recorded: On June 10 larvæ of all stages were found working in the elm leaves; on June 18 many larvæ had left their mines, the deserted leaves, of which the inner

tissue had been in many cases completely destroyed, becoming brown, curled up and withered in appearance. On this latter date the majority of the larvæ still in the leaves were nearly full grown. Larvæ were found less than one inch below the surface of the soil, but apparently had not begun to construct their cocoons.

The Injury.—The injury to the foliage is caused by the eating away of the inner parenchymatous tissue of the leaf by the numerous larvæ. Each larva starts an individual mine, but as the cavities become larger they unite and the entire leaf surface may be blistered. The work of the miner becomes most conspicuous in the month of June. The leaves become blotched and blistered, those in which a large number of larvæ have been working turning brown and withering. In the case of two medium size English elms at Collins Bay, Ont., the whole tree was affected, the foliage assuming a brownish-red colour with the appearance of having been scorched by fire. The Scotch and English elms are apparently the most liable to severe infestation, and a careful watch should be kept of these for signs of this type of injury.

Methods of Control.—In a bulletin on the control of two elm pests* Professor Herrick has discussed the control of this insect. Pending further experiments his recommendations may be quoted here. The spray recommended is a tobacco extract containing 40 per cent nicotine sulphate; 1 pint to 100 gallons of water with five pounds of soap added, being the formula recommended.

The spray *must be applied early* in the season just as soon as the tiny mines appear in the leaves and both the upper and under sides of the leaves must be thoroughly coated. Black-Leaf 40 diluted 1 pint to 100 gallons of water with 9 pounds of laundry soap added was also found to be an efficient spray when applied early in the season. Mr. C. B. Hutchings, of

*Herrick, Cornell Univ. Agric. Expt. Stat. Cornell Univ. Bull. 333, May, 1913.

the Entomological Branch, in a series of experiments on the Alder Sawfly Leaf-Miner *Kaliosysphinga dohrnii* Tisch., an allied species, at the Central Experimental Farm, Ottawa, found that kerosene emulsion, 1 part stock solution to seven parts of water, was effective when used at the

flies failed to emerge from cocoons at greater depths he recommends the practice of removing a thin layer of soil from below infested trees, and burying it at a depth exceeding six inches below the surface. In carrying out this method of control two points should be taken into consideration:—



Kaliosysphinga ulmi, Sund; THE ELM SAWFLY LEAF-MINER. LARVAL MINER IN LEAVES OF CAMPERDOWN ELM (KINGSTON, ONT.)

time the larval mines were just commencing. This method would doubtless be effective in the case of the Elm Sawfly as well.

A cultural method of control was employed by Professor Slingerland in the following way. Finding that pupation takes place within an inch from the surface of the soil and that

1. Care should be taken to remove the soil during the early spring over an area exceeding by a foot or two the circle bounding the points which the longest limbs attain.

2. The soil removed should be buried without delay and the operation concluded before May 1.

It is urged that owners of elms

infested with the leaf-miner adopt one or both of these methods to prevent the development of the insect again next season. Preparation should be made to spray the infested trees with

nicotine sulphate (Black-Leaf 40, "" or "Nikoteen") or with kerosene emulsion in June as soon as the smallest blisters appear on the leaves.

THE FRUIT BRANCH

MARKETING SERVICES

C. W. BAXTER, FRUIT COMMISSIONER

ALL the work of the Fruit Branch has a more or less direct bearing on marketing, and may be summed up under the following heads: enforcement of the Inspection and Sale Act, Part IX, and related work; dissemination of special information to producers, shippers, and dealers; crop and market reports; transportation.

INSPECTION

The Fruit Marks Act (now Part IX of the Inspection and Sale Act) was passed originally to remedy certain evils in the Canadian apple industry; previous to its passing, over-facing was the practice of the day and no reliance could be placed upon the grade marks used, as these varied with the season and according to the judgment of the individual packer. The principal provisions of the Act provide the manner in which fruit packed for sale shall be marked, certain standards for grading, a penalty for over-facing and, also, standard packages for practically all fruits grown commercially in Canada. With definite grades established by the Act and enforced by the inspectors of this branch, the industry has been placed on a more stable basis and a confidence has been established in the trade that did not previously exist.

In the early days of the enforcement of the Act practically all the inspection was done at the ports of export and in the larger consuming centres, and was confined principally to apples. As the advantages of the inspection service became apparent,

growers, shippers, and dealers urged upon the department the necessity for extending it to include all commercial fruits and, during the past couple of years, certain vegetables have also received the attention of our inspectors. Commencing in 1914 the system of inspection at point of shipment was inaugurated; practically the whole staff of some sixty inspectors now work among the growers and packers in the producing districts, not only inspecting the fruit after it is packed, but giving instructions in the proper methods of picking, packing, grading, and shipping. Instead of waiting to detect false packing or improper grading after the fruit has reached the market, the inspectors devote their attention to preventing the evil, thus protecting the grower from commercial and financial troubles when he markets his fruit and, in addition, protecting the consumers, and establishing greater confidence in the trade.

During the past few years officers of this branch have been authorized to give any shipper desiring it, a copy of the report referring to his fruit, which is often attached to the bill of lading, by request of the consignee. Such a report does not vouch for the contents of the car but for those packages only which have been actually inspected and marked by the inspector, but dealers have demonstrated their willingness to purchase cars on the strength of these reports. The value of this is particularly noticeable in the case of long distance shipments, especially to the prairie markets.

Special efforts have been made during the past year to assist in the settlement of disputes between shippers, and dealers. In the past, losses and waste of fruit and vegetables have occurred frequently through consignees refusing to accept cars. To facilitate prompt delivery, ensure fairness to both consignee and shippers and avoid unnecessary waste, our inspectors are authorized to make inspections of rejected cars or shipments upon request of either shipper or consignee, sending copies of their reports, showing the exact condition of the goods, to the applicant.

PACKING

In addition to the actual work of inspection, the inspectors are able to

branch and in the amendments to the Inspection and Sale Act of 1918 all the fruit packages in common use are standardized.

SPECIAL INFORMATION

The inspectors in the field, as well as the head office, are able to give authoritative advice with respect to the varieties, packages, and methods of pack most popular in the various marketing centers, both at home and in competing countries. Dealers can also obtain from this office and our staff, information as to where certain fruits or certain varieties may be best obtained at any particular season. Lists of growers and dealers in any particular section are furnished as required. Correspondence with grow-



MUCH OF THE TENDER FRUIT IS INSPECTED ON THE RAILROAD PLATFORM

do a great deal of educational work, all of which tends towards better practices in marketing the Canadian fruit crop. Modern methods of packing and co-operative marketing have been encouraged. In connection with packing, we have co-operated directly with the provincial departments of agriculture, and officers of this branch have been loaned on many occasions to conduct packing schools or give assistance at short courses at the agricultural colleges. In addition, the branch has one officer who devotes practically all his time to giving instruction in barrel and box packing. The standardization of packages has also received the attention of this

ers, packers, shippers, and dealers is invited with respect to anything pertaining to the commercial fruit and vegetable industry.

CROP AND MARKET REPORTS

During the past twelve or thirteen years, this office has issued monthly crop reports during the growing season, showing the condition of the various fruit crops in Canada and in competing countries. The report is published from June until October, and is sent to a mailing list of about nine thousand names. In 1914 a bi-weekly telegraphic market report system was inaugurated. This re-

port, compiled from telegrams sent to this office by members of the staff, includes cabled information with respect to the British markets; it is issued from the middle of August until the close of the apple shipping season, and is published simultaneously at Vancouver, Winnipeg, Middleton, N.S., and Ottawa in order to secure a prompt local distribution. The publication of these reports, containing authentic information relative to the movement of fruit and vegetables, market prices, etc., has a tendency to secure a more equal distribution of these products, minim-

injury to both. The carriers want all the traffic they can get, and the fruit and vegetable growers want the best possible service for their produce. Successful co-operation in marketing requires co-operative practices between the carriers and the producers. The Fruit Branch, through its transportation work, endeavours to span the somewhat imaginary gulf that now exists and always will exist between the individual shipper and the carrier. Briefly, it is proposed that our transportation work will make marketing easier and more satisfactory. Within the past few months it has been



INTERIOR OF A PACKING HOUSE WHERE MANY APPLE SHIPMENTS ARE INSPECTED

izing the danger of gluts, and keeps growers and shippers thoroughly advised as to the prices received in the various markets.

TRANSPORTATION

Owing to the perishable nature of fruit, it would be dangerous to encourage development and overlook the necessity for maintaining the best possible transportation service. The railway and express companies and the fruit and vegetable industries are inter-dependent; injury to one is

possible to successfully negotiate both with the railway and express companies, matters pertaining to the improvement of the service for perishable products; shelters have been constructed at points where the traffic warranted; tariffs have been amended to permit of a more uniform distribution; team tracks or sidings have been constructed to facilitate the loading of carload shipments; agents have been appointed at certain flag stations for the fruit season. By having specific information supplied from an authoritative source, the

carriers have co-operated with this branch, and have given special attention to deliveries of perishables upon request. Each fruit district of the Dominion is visited if possible at least once a year by the representative in charge of this work. Meetings of growers are attended and local transportation grievances investigated and discussed.

During the heavy movement of the Nova Scotia apple crop in 1917 and 1918 an officer was located at

Kentville to collect and disseminate information relating to tariffs, routings, car supplies, ocean space, etc. This was found to be of great help to marketing in many ways. Similar work was also performed in New Brunswick and Prince Edward Island in the marketing of the potato crop, and assistance will be gladly given from this office in any matters that will tend to improve local shipping conditions in the fruit and vegetable producing districts of Canada.

THE LIVE STOCK BRANCH

EGG AND POULTRY MARKET CONDITIONS IN EUROPE

BY W. A. BROWN, CHIEF POULTRY DIVISION.

A GLANCE at the European markets of pre-war days will help us to appreciate the problems that lie before us. At that time Britain was the heaviest European importer of eggs, while Germany, a close second in eggs, was the biggest importer of poultry. Over 50 per cent of Britain's egg imports came from Russia, the balance from over fifty other countries.

Many changes in trade movement have occurred during the war. The Canadian west has ceased to import eastern eggs and is now a producer. For a dozen years Canada's export of eggs to Britain had been dwindling while she catered to this home market, but in 1915 the first carload of western eggs came east and three years later, in 1918, over two hundred carloads of eggs came from the west. Canada is entering the export trade and this year's indications are for a large increase over the amount shipped in 1918.

BRITAIN LARGEST IMPORTER.

Britain is still the biggest egg importer. Her present need is Canada's opportunity, and her need is great. In spite of the fact that Canada's egg production has speeded up, her exports to the United Kingdom during the war amounted to

only $1\frac{1}{4}$ per cent of that country's requirements. Last year Britain was short nearly 170,000 long tons of shell eggs.

The withdrawal of Russia as an egg exporting country leaves the Dominion in a most favoured position for the British trade. With an improved system of grading and standardization Canada has established a guarantee for eggs bearing the name of "Canada", or "Canadian. Canadian eggs are in high repute on the British market.

Aside from the egg market Europe offers opportunities to the producer of dressed poultry. At the beginning of the present year the outlook for export trade in dressed poultry was dark for Canada. Poultry handlers had paid high prices for the product, but space could not be secured for its shipment. All space was under the control of the British Ministry of Shipping and was reserved for the shipment of frozen meats. The situation was tense. The high prices offered in January were lower in February and March. Space was still unavailable and the States were waiting with their produce for the earliest opportunity of shipping. Through representations from the Department of Agriculture, and the High Commissioner's office in London,

space was ultimately obtained and we have shipped nearly 1,000,000 pounds of dressed poultry to the British markets. The United States are now making shipments as well.

PACKING HELPS PRICE.

In this connection we should remember that ordinarily the States' poultry sells for a better price than Canadian on the British markets. It is better packed. To compete with them we must see that our poultry is graded and standardized in the same efficient way as that of some of the larger firms of the United States.

Governments, thinking people, and the world-wide public are taking a remarkable interest in the poultry business just now. It has a *near* future. It is a significant fact that the International Poultry Conference called at London in March was the

first specialized international industrial conference held after the cessation of hostilities. The present outlook for the industry is bright. In Canada we could treble our production between now and next fall and still find a ready European market for all our products because there is little competition. However, other countries are active. Italy and Rumania expect to have some eggs to sell this fall. China is shipping large quantities to Great Britain and when all the great egg producing countries in the world get their stride and commence to ship to the few importing countries there will be keener competition.

That is the ultimate problem to be faced in a national and international way. The solution would appear to be more economical production on the farm and increased consumption at home and abroad.

SEED BRANCH

ASSISTANCE IN SEED MARKETING

GEO. H. CLARK, SEED COMMISSIONER

THE general work of the Seed Branch in seed production, seed testing, seed inspection, and seed marketing may be outlined briefly from the standpoint of assistance in marketing. Efforts in seed production have aimed to increase not only the quantity but the quality of the seed supply, and result directly in facilitating seed marketing. Seed testing, both purity analysis and germination reports, provide a basis of quality on which inspection and sales are made. Seed marketing may include the war-time operations of the Canadian Government Seed Purchasing Commission and the usual assistance in seed marketing which is now focused through the organization of a Markets Intelligence Division.

During the calendar year 1918 practically \$35,000 was paid out of the Seed Branch vote to promote

field crop competitions, seed fairs, and provincial seed exhibitions, which are conducted under the provincial departments of agriculture. Approximately another \$35,000 was expended by the provinces in conducting these services, and in all there were 400 field crop competitions with inspection from the standpoint of seed production, 153 local seed fairs, and eight provincial seed exhibitions. The published reports of competitions, fairs and exhibitions are excellent advertisements of seed for sale, and the fairs, and exhibitions with their prize premiums for superior seed are, in effect, seed markets.

A further grant is made to the Canadian Seed Growers' Association which encourages the production of registered and improved seeds, publishes a seed catalogue, and serves as a clearing office for marketing.

SEEDS CERTIFIED.

Field root and vegetable seed crops and re-cleaned seed are inspected and, if satisfactory, certified for market. Growers are put in touch with a market through contracts offered by the seed trade, and those who prefer to grow for sale on the open market have their seed listed by the Seed Branch and the lists given distribution to the trade and purchasing organizations.

The Board of Grain Commissioners has co-operated with the Seed Branch in providing facilities at the Canadian government interior terminal elevator at Calgary for the assembling, cleaning, grading, and storing of Alberta timothy seed. The service has proved very valuable by enabling the growers to put their seed on the market in a finished condition. Steps are being taken to extend this system to the handling of grass and clover seeds produced in the Province of Quebec, and it is contemplated that the seed growers of Ontario will be provided with a similar service through the proposed erection of a Canadian government elevator for western Ontario.

SAMPLES TESTED.

Any seed grower in Canada may have samples of his seed tested free of charge, up to twenty-five in number, at a Dominion seed laboratory. Timothy, red clover, alsike, and alfalfa seeds are graded and an official certificate issued on the sample submitted. Purity and germination reports are given on all seeds when required. These certificates are used by the seller to indicate the quality of his seed and assist him in finding a market.

Dominion seed inspectors are placed at Canadian government interior terminal elevators to inspect, for separate binning, superior grain that may be cleaned to seed grades without excessive dockage. Incoming

seed certificates are issued on each carlot, and, on being cleaned for sale, an ex-elevator seed certificate indicates the grade No. 1 seed or No. 2 seed. This service is available at cost to private growers, farmers' organizations, or grain merchants, and during the past three years to the Canadian Government Seed Purchasing Commission.

SEED PURCHASING COMMISSION.

The abnormal condition of seed markets during the war and the great need for abundant seed supplies to increase production made necessary the organization of a Seed Purchasing Commission which was in effect a Division of the Seed Branch. The Commission purchased, assembled, stored, cleaned, and distributed this past season seed supplies of wheat, oats, barley, and rye to the value of more than six million dollars. The business was conducted as nearly as possible at cost, and the moneys as received from the sale of seed were returned to the government. In purchasing, premiums were paid for supplies of superior quality. Over 400,000 bushels of seed oats were purchased in Ontario and Prince Edward Island and distributed in the prairie provinces. This quantity was required to supplement the western seed oats available to the Commission for distribution in those districts which had their crops damaged by drought or frosts. Approximately 100,000 bushels of seed oats, carried over the previous season, were distributed in the Province of Quebec. It is not anticipated that the Commission will be required on the return of normal conditions.

Direct encouragement to seed marketing will be provided through the Markets Intelligence Division. Seed crop and market reports will be issued, growers and producing organizations will be put in touch with the markets, and where possible new markets will be developed.

PART II

Provincial Departments of Agriculture

THE EFFECT ON AGRICULTURE OF CO-OPERATIVE BUYING AND SELLING

ONTARIO

RAINY RIVER DISTRICT

BY R. E. CUMMING, B.S.A., AGRICULTURAL REPRESENTATIVE, EMO

IN this district we have seen very pronounced effects on agriculture from not having proper co-operative organizations for marketing our produce. At one time the Rainy River Potato Growers' Association was organized throughout the district and for over three years it met with unusual success and was doing thirty-five thousand to forty thousand dollars worth of business annually. Due largely to mismanagement it was necessary to discontinue business with a considerable loss to the shareholders. This

means that co-operation, as far as marketing is concerned, ceased to exist during 1917-18. The whole district has suffered as a result. We are so located that we have no local markets and therefore produce has to be shipped out in carloads. Last fall, when potatoes were selling on eastern markets at \$1.50 to \$2.25 per bag our farmers were able to secure only 75 to 90 cents per bag for first-class tubers. Rainy River district feels the lack of facilities for co-operative marketing very keenly.

WINONA FRUIT GROWERS' ASSOCIATION

SECRETARY, J. R. HASTINGS

FRUIT growing is an almost exclusive branch of agriculture in this district and co-operation in marketing has to do almost entirely with this industry, hence this information will deal with a specific case showing briefly one instance in which co-operation has had a decidedly beneficial effect on agriculture.

When I first got in touch with this section about thirteen years ago, there was no such thing as co-operation either in marketing or in any other branch of the industry. I was operating a fifty-acre orchard and the most discouraging phase of my experience came by reason of the fact that we growers had practically nothing

to say as to what prices we should receive for our produce, the shipping business was almost exclusively in the hands of local dealers who, I dare say, were in most instances paying the growers all the market, under their method of handling, would warrant.

In 1908 a few of our growers decided to get together to do their own marketing and to co-operate along other lines affecting their business, an organization was formed, and at the end of over ten years, experience can point to a thoroughly satisfied membership and a record of unmistakable success.

(1) Through co-operative handling and marketing this organization has been getting the best prices the market

would pay. Its business has been conducted at a minimum expense and it has—beyond all question—brought to its members better average returns than the unorganized growers have been receiving.

(2) It has absolutely relieved its members of the difficult task of marketing, for which few are qualified, and left them free to devote their attention to the production end and the putting up of a more attractive pack.

(3) By organized and co-operative effort it has not only raised the standard of pack of its own members but has, I am told, had a marked influence in creating a better standard for this district and beyond.

(4) Its credit is good and by purchasing supplies in a wholesale way its members get the benefit of lower prices and co-operative effort

and management give prompt and smooth service to its members in all matters affecting their business operations.

We have other organizations in the Niagara Peninsula which I believe have been successful and I feel that before many years pass the needs of the fruit industry will force into existence one co-operative concern which will handle the fruit industry of the whole peninsula. I know of no reason why this cannot be done and with advantage to both producer and consumer.

I have in mind some alleged co-operatives that failed. Their failure was inevitable. Some lines of business will stand up to mismanagement for a period but lack of efficient handling will bring speedy failure to a fruit growers' organization.

VINELAND GROWERS' CO-OPERATIVE LIMITED

W. GAYMAN, MANAGER

WE are a co-operative company in name only. In reality we are a joint stock company but, instead of having twenty-seven outsiders for our stockholders, we have twenty-seven farmers and fruit growers. There is therefore an incentive for our members to trade with our company. Take feed for an example; quite a number of our growers think their land too expensive to grow grain and feed with the result that they are large buyers of this commodity. Last year we sold \$45,000 worth of feed to our members cheaper than they could have bought it at any other large centre, and we profited some \$3,000 on the transaction. This profit went back to the farmer-shareholders. The same could be said of other supplies we handle, such as coal, baskets, crates, binder twine, spray material, and fertilizers, the profit varying in proportion to the amount of business done.

We do not look upon the money side altogether. During the past two

years our community has needed a grist mill, so last fall our company installed one, not as a moneymaker for the company, but as a convenience to the community. The result of all these things combined is that these twenty-seven men make farming their business rather than their occupation and finally they are contented farmers. In every case, too, their sons aspire to the high calling of a farmer.

In selling our produce we get together possibly twelve or more times each year. This is undoubtedly one of the strongest influences of co-operation. We discuss common interests, for example, one of our growers during the year 1915 had a fairly good crop of peaches. In getting together these fellows discussed their methods of trimming. They were quite opposite. Having the Vineland Experiment Station near us we asked Mr. Clement, the director, at that time, to hold a pruning demonstration in the experimental orchard. This was

done. It was well attended and good results ensued, so much so that a great many of our men to-day are trimming the very opposite to what they formerly did. Profitable discussions similar to the above take place regarding fertilizers, cover crops, and other subjects of interest to the growers.

Then there is the financial side of the selling of the product. Our members bring all of their fruit to us

to sell. We are continually in touch with all of the markets and we also keep posted in the outlook in neighbouring sections. We may not always get the very highest price for all of our goods, but we generally do, and on an average we do get a profitable growing price. At the end of the year again any surplus goes back to the farmer-shareholders and in our case we have always had a very nice surplus.

SARNIA INDEPENDENT VEGETABLE GROWERS' ASSOCIATION

BY HENRY BROUGHTON, MANAGER

WE find that co-operation induces the growers to feed and cultivate their lands by more intensive methods thus securing larger crops and more satisfactory returns. These crops are marketed more satisfactorily and at greater profit to the producer, because through co-operation larger and more numerous markets are available. These markets are made possible to small or average producers owing to the fact that it is possible for these growers to ship in large quantities by co-operative handling.

No one or two producers could completely load a car but the association is able through its many members to ship in car loads and supply markets at great distances. Through co-operation we are able to market our produce more cheaply because overhead expenses are eliminated through the reduction of middlemen handling our goods. We employ a salesman who is allowed a commission of from 5 to 10 per cent on the selling

price of all produce marketed by the association. This commission, which provides adequate remuneration for the salesman, is much less than would be exacted by local buyers in order to clear their expenses and secure the profits they require.

Our land values have increased 50 per cent on account of co-operative marketing because we are able to secure much higher returns from our land. These higher returns are brought about by the extra time the grower puts on his land which he would otherwise have to spend in marketing in a small way. Also a gain is made in the purchasing of fertilizers and other necessities used in quantity, at wholesale rates, and in avoiding all waste of marketable produce. Co-operative selling tends toward more uniform quality of produce and uniform packages for shipment. This uniformity in appearance and quality advertises our produce wherever it is marketed and thus our community gains in reputation.

LEEDS COUNTY CO-OPERATIVE ASSOCIATION

BY WALTER H. SMITH, B.S.A., AGRICULTURAL REPRESENTATIVE

THE Leeds County Co-operative Association did a gross business amounting to \$206,536 in 1918. The sales included 100,000 dozens of eggs, \$14,350 worth of live poultry, and \$66,420 worth of live

stock. On eggs the gain amounted to from three to five cents a dozen; on poultry, five cents per pound, and on live stock, from one to one and a quarter cents per pound. Members of the association purchased feed to

the amount of about \$60,000, on which a gain of from ten to twenty-five cents a hundred was secured.

The financial benefits were secured not only to the members, but farmers who were non-members living in the community received higher prices than if our association had not been in operation. The educational value

obtained from co-operation is even greater than the direct financial gain. As all commodities are handled on a graded basis, the members pay attention to the quality of their products and consequently not only improve the commodities themselves but adopt better methods of handling.

SASKATCHEWAN

PARKSIDE CO-OPERATIVE ASSOCIATION

BY W. E. KIMBER, SECRETARY

OUR district has benefitted in many ways by our co-operative efforts. In the first place we estimate that our shippers of live stock have received from a half to one cent a pound more through us than they would have received through the ordinary stock buyer. But this financial gain is not the outstanding feature of co-operative selling. Formerly the buyer purchased our live stock at a flat rate per pound, regardless of its condition, with the result that there was no incentive to raise stock of a particularly high grade. However, when we started co-operative shipping the man with the well-bred, well-finished stock found that his cattle were decidedly more valuable than they were before, while the farmer who shipped half finished scrub animals received less for his animals than formerly, thus our producers came to realize that well-finished animals, of high grade, were of greater value than the ordinary stock. This resulted in a rapid improvement in the stock raising of this vicinity. It is possible that this same result would have been attained through copious advertising, but it is doubtful if the farming community should have so quickly realized the advisability of raising well finished cattle through any other medium than the co-operative association. This medium has made possible the direct contact of the producer with the large buyer and through this

contact he has come to study market conditions and market demands.

Through co-operative purchase of the requirements of our patrons we have added at least five per cent to the purchasing value of our money on all necessities. On twine, lumber, and various building materials we have saved from ten to thirty per cent. These estimates are very conservative. Taking into account a year's buying for the average family the saving to shareholders and patrons has been considerable.

Not alone in a financial way has co-operative buying added to the wealth of our community. By engaging in trade we have encountered all the trials and difficulties as well as the advantages of those who formerly did this work for us. This means that we have been forced to look on both sides of the marketing question. This has given us a broader outlook and a more sympathetic consideration of all classes, both rural and urban.

Perhaps the most valuable outcome of co-operative purchase has been the elimination of buying on credit. Dealers used to encourage our farmers to buy on credit and make payments after the season's crop was harvested. There was a growing disposition on the part of our farmers to follow this detrimental practice. Credit buying resulted in purchases to the limit of anticipated crop possibilities and in many cases the

crop was not sufficient to square the season's debts. As a co-operative concern we discouraged credit purchasing and encouraged cash payment for all commodities. The result is that the value of the coming season's crop is not spent before the crop is harvested.

Our association is managed by nine directors, who are periodically changed. By this means our leading farmers are constantly coming into a

position where they are enabled to study conditions and policies which will be for the betterment of the community. Being leaders they are able to speak with authority and coach the individuals of the community in the lessons they have learned. One important feature of this institution is that it has taught us not to secure all we can for our produce but to get out of it all that it is worth and no more.

TURTLEFORD CO-OPERATIVE ASSOCIATION

BY JOHN F. BURNS, SECRETARY

FROM the farmer's standpoint the co-operative movement here has been of financial benefit in two ways.

BUYING FARM REQUIREMENTS

The shareholders owning the business decide on policies and prices. This gives them a knowledge of market conditions and prevailing prices and eliminates the old suspicions that were entertained by farmers dealing through traders under the old system. By setting their selling price they have the option of selling their goods in the same way as the private store and reap the benefits at stated intervals or they can cut these prices to an out-of-danger margin and reap the immediate benefit. It is questionable which of the two principles is the better (a) the deferred patronage system or (b) the cheapening of goods which gives immediate benefit. Since our inception we have adopted the second method with satisfaction to all. No absolute data have been compiled as to the monetary benefits derived under this system but from evidences of reliable parties I would estimate our saving on purchases to be from 15 to 30 per cent on a year's trade. This may not sound reasonable at first but taking into account the needs of a family and comparing private prices with co-operative prices I am convinced that the actual saving in buying is between fifteen and thirty per cent.

MARKETING LIVE STOCK

Through co-operative selling we are able to make closer comparisons between the prices paid by private buyers and those we realize from our co-operative shipments of live stock to public markets. At the very closest the private buyer cannot go more than a two dollar per cwt. margin. We show a market charge on an average since the beginning of the year of a trifle over ninety-six cents per cwt. This means a saving of at least one cent a pound to our patrons. With a total shipment of 1,400,000 pounds last year we reasonably claim to have saved our patrons \$14,000 on the marketing of live stock alone. The bulk of this money is circulated in the neighbourhood to the betterment of the pioneering conditions.

While we can undoubtedly understand the commercial benefits of the co-operative movement in any district it would not last very long without an undefinable "spiritual" side to it. Were we purely commercial, chaos would be the result. From my observations there is a peculiar state of mind in westerners that tends to a co-operative spirit commercially and socially. We are from all parts of the world and separated from our kin and connections and the many things that went to make up our life. We are by nature social animals and the experience we get here, in pioneer-

ing, rub off the last vestige of our "grundyisms" and we gravitate toward our neighbours in an almost

natural way. The part the co-operative movement plays in this activity is, I consider, its greatest benefit.

BIRCH HILLS ASSOCIATION

BY JOHN R. TAYLOR, SECRETARY

THE system we have adopted in carrying on the business of our association is to work on a safe margin of profit and create a dividend at the end of the year. This has not had the effect of showing the immediate advantage at the time of purchase or sale and many, unfamiliar with co-operative principles, are not doing as much business through the association as they should. It seems that the education necessary to make clear the benefits of co-operation takes longer under this system than if we arranged matters so as to show a direct saving to our patrons at the time of purchase and sale.

A number of individuals in this community are not in favour of co-operation. They do not believe in it but even they are profiting by the very existence of a co-operative association in their vicinity. This benefit arises through the enhanced value of their produce, which is

brought about by the activities of the association. There was no system whatever among buyers of live stock when we started business. Producers had little idea of the cost of shipping cattle to market, and buyers had barely more knowledge. They knew what an animal was worth and purchased it at the lowest price always making sure they would come out ahead. To-day buyers are all working on a margin based on a reasonable profit plus the cost of shipment. In some cases private buyers have offered prices which they could not afford to pay in order that they might hold the farmer's trade.

From a study of present conditions, and conditions existing before the activities of the association commenced, it is quite evident that the whole community is benefited financially and socially through co-operation.

ROZILEE CO-OPERATIVE ASSOCIATION

BY J. W. PAINE, SECRETARY

THE benefits resulting from co-operation we find to be direct and indirect financial gains and a better understanding of business principles. In 1918 our members made a direct gain of \$3,495.22, which was secured from a gain of five-eighths of a cent per pound on 559,221 pounds of live stock. They also made a ten per cent gain on \$57,000 worth of supplies purchased. The indirect gains secured on goods and stock handled amount to perhaps twice as much as direct gains.

OTHER BENEFITS.

Farmers are learning that they can handle their own business better than any one else can handle it for them. A better understanding of market conditions leads to the removal of much mistrust and misunderstanding. Co-operation tends to make the farmers of the community more self-reliant, opens up the possibility of a more adequate return for their labour, and gives a greater sense of security especially

to the smaller man. Under the old system of selling live stock the smaller man was offered reduced prices and he practically had to accept them while under the co-operative system all patrons are treated equally and receive the high-

est returns. By marketing their own live stock farmers are learning what is required and are encouraged to improve their methods. In spending money at their own store they are more interested knowing the profits will come back to them.

ALBERTA

UNITED GRAIN GROWERS' LIMITED

BY E. J. FREAM, SECRETARY

IT is now generally admitted that the farmer trading companies have been successful in securing for their shareholders and customers what they had in view, and the direct benefit which has resulted to all farmers in Western Canada, will amount up to a vast sum. Two ways alone need be recounted in substantiation of this. Before the farmers' companies were organized such a thing as the special binning of grain by farmers was practically

unheard of. To-day nearly all elevator companies are catering to the farmers in this direction, even going so far as to remodel the elevators owned by them in order that they can take care of the special bin business which may be offered them. The other big saving is the result of the narrowing of the spread between the street and track prices, and in these two directions the farmers, through their own companies, are directly responsible

TRAINING FOR AGRICULTURAL JOURNALISM

OKA AGRICULTURAL INSTITUTE

BY BROTHER ATHANASE, PROFESSOR OF HORTICULTURE

THE course in agricultural journalism at the Oka Agricultural Institute has, so far, been mainly of a practical nature.

As some of our students are training for the work of agricultural representative, it is essential that they should be able to make out reports of their visits to the farmers, of the public and agricultural meetings they may attend, as well as write articles to recommend the adoption of some desirable method of farming. For this purpose, about eighty hours are spent in the first years of the course on French and English composition in the class room, to train our students in this kind of work.

In addition, and with the same object, two special associations, the

St. Isidore Agricultural Club and the Agricultural Co-operative Association, both conducted by the students, under the supervision of the authorities of the school and operating in the same manner as all other co-operative associations of Quebec, have been organized. These associations hold public meetings every Sunday; the subjects for discussion must be put down in writing and submitted to the director of the Institute. These meetings have been of great benefit to our students by making them accustomed to public speaking, they learn to answer unforeseen objections, and to discuss thoroughly all sorts of agricultural questions, orally or by writing.

These associations have fostered, in

many of our students, a desire to try their pen in various papers of the province, and specially in the *Journal of Agriculture* of Quebec, *Le Devoir* of Montreal, *Le Droit* of Ottawa, and *Le bulletin des agriculteurs* of Montreal.

A small agricultural review has also been founded by our students during the present school year, always for the purpose of training in agricultural journalism. This modest monthly magazine, which is regularly constituted with a board of directors, the members of which are students of the institute, and a board of censorship,

formed by the principal and two professors, has already given to a number of our students the opportunity to make their first attempts at journalism.

As may be seen, by the above, practice has taken the lead on theory in this institution, but it may be hoped that the course in agricultural journalism will develop as years go by. Thus trained, both in theory and in practice, we believe that these young men may, when opportunity arises, deal authoritatively with any agricultural and co-operative question.

ONTARIO AGRICULTURAL COLLEGE

BY O. J. STEVENSON, M.A., D. PAED., PROFESSOR OF ENGLISH

IN framing the course of study in English at the Ontario Agricultural College we have had to bear in mind that every graduate may at some time or other wish to contribute articles to agricultural journals. All students, therefore, in the third and fourth years, are required to take a course in journalism. This course, while suited to the needs of any student, no matter what his scientific option may be, provides at the same time necessary training for those students who intend to enter agricultural journalism as a profession.

In the first and second years the aim of the course in English composition is to train every student to write clearly and effectively—to say what he has to say forcefully and in correct English. The students in the freshmen class come from all kinds of schools and some have been out of school for many years. We find that those who can write good English when they come to us are comparatively few in number. They are required, however, to take 50 per cent in composition at the end of the first year and no one is permitted to enter the third year unless he obtains 60 per cent in English. The result is that students in the freshmen and sopho-

more years are anxious to improve, and that those who enter the junior year have a fairly good command of English.

Furthermore, any student who has an inclination towards journalism has an opportunity to get more or less practice throughout the course, as contributor to the *O.A.C. Review*, or as staff editor in charge of a department of the magazine. The editor and associate editor are students of the senior years.

The courses in journalism proper are given during the third and fourth years. They are in charge of a practical journalist and are of necessity short courses of from ten to fifteen lectures to each class. The editors of the *Farmer's Advocate* and of the *Canadian Countryman* have each given the courses for two or three years in succession. The lectures involve practical exercises in interviewing and reporting, and in writing news reports and editorials. The work of the fourth year is, needless to say, of a more advanced character than that of the third year. In both years the student's marks in journalism are considered in making up his year's standing.

MANITOBA AGRICULTURAL COLLEGE

BY J. B. REYNOLDS, M.A., PRESIDENT,

THE training given at this institution for agricultural journalism is of two kinds. In the first place we carry our instruction in English through the whole of the degree course and that instruction consists of a study of English authors, of frequent compositions on chosen subjects, and a practical training in public speaking.

The special work in journalism is confined to one year during which a

member of the staff of one of the farm journals is secured. This instructor gives a number of lectures on the principles and methods of journalism and assigns a number of exercises in the form of news writing, reporting addresses, and editorial writing.

It is the intention of this college to enlarge the work in journalism by extending the special instruction to two years.

UNIVERSITY OF BRITISH COLUMBIA COLLEGE OF AGRICULTURE

BY L. S. KLINCK, B.S.A., PRESIDENT,

THE curriculum for students proceeding to a degree in the University of British Columbia has just been completed for 1919-20, 1920-21. Although definite provision has not been made in the course for training in agricultural

journalism, plans are being worked out to include a course in public speaking and also in agricultural journalism. It is hoped to have these added to the course in the near future.

GOVERNMENT SERVICES TO FACILITATE MARKETING

NOVA SCOTIA

BY M. CUMMING, B.A., *B.S.A., LL.D.,

WHILE from time to time our Department of Agriculture has rendered useful services in assisting co-operative farmers' companies, individual farmers, creamery companies, and others to dispose of farm produce, yet as a department, we have not attempted anything very comprehensive to facilitate marketing.

In respect to dairying our provincial department of agriculture has for some years endeavoured to keep the various creameries of the province in touch with markets and market quotations and is now receiving substantial assistance from the federal department of agriculture who are issuing weekly telegrams in respect

to this subject. This is the only really organized marketing service we have.

From time to time our department has facilitated by securing information, by sending representatives, and by correspondence, to market certain products for which little demand seemed to exist. However, in general it is our belief that the problem of marketing farm produce of all kinds can be handled to best advantage by private individuals, private companies and co-operative companies. These individuals and bodies can from time to time seek aid from the department of agriculture in respect to such lines of marketing. Through having provided the necessary legislation and

other facilities for organizing and forming co-operative companies, the department may thus be regarded as

having indirectly facilitated marketing operations.

NEW BRUNSWICK

E. P. BRADT, B.S.A., SECRETARY FOR AGRICULTURE

THE Horticultural Division works with the Fruit Growers' Association in the co-operative grading, packing, and marketing of apples, supervising the actual work of putting up the product, arranging for its sale, and keeping in touch with its condition at destination. This work, which was started in 1917, is much appreciated by the growers and is a real help to apple growing in New Brunswick.

It has secured a better distribution of, and better prices for early and late fall varieties, which in some years are quite plentiful on our local markets at comparatively low prices. The improvement in the grade and quality of pack, with resulting increased returns and improved reputation for our fruit, all of which are direct results of this work, make the best inducement to our growers to give their orchards better care. It is the practical application of the principle that "profitable markets are the best incentive for greater production."

GRADING AND PACKING.

In 1917 the fruit was graded and packed under our supervision, right in the orchards, as it was picked, or in the farm shed or cellar. In 1918, by way of experiment, it was decided to try out the central warehouse plan. Accordingly, suitable warehouse accommodation was secured in Fredericton, and the apples were delivered there tree run. Growers above the city hauled the fruit in, while those from down river sections sent theirs in by the river steamers.

With strawberries, our work has consisted of placing growers in touch with reliable dealers in Montreal and keeping them informed daily by letter and telephone of market conditions there and wherever possible, encour-

aging shipments to that and other outside markets at times when gluts on local markets were imminent.

As in the case of apples, this work has for its objects the improvement of the quality of the product offered and the stabilizing and equalizing of the distribution of the crop with consequent improved returns to the grower—which constitutes the best and truest incentive to greater production.

In 1917, this work was started in the Fredericton section and was extended in 1918 to the section around Cumberland Bay in Queens County and to the section about Hampton and Bloomfield in Kings County. It has resulted in placing a considerable quantity of berries on the Montreal market at prices which yielded good returns to the growers and the quantity thus disposed of outside prevented prices on the local markets from falling down to or below the actual cost of production.

MARKETS INTELLIGENCE.

The Livestock Division of the department has established a Markets Intelligence Branch for assisting in marketing the pure-bred stock of the province. Every few months those with stock for sale list their animals with the department, giving name of animal, breeding, age, sex, and price asked. This information is tabulated and sent to those inquiring about the purchasing of such stock. A great many sales are made in this way and the department is kept in close touch with the amount of pure-bred stock in the province.

Considerable attention is also given by the department in assisting in marketing the wool clip of the province, through the Canadian Co-operative Wool Growers' Association. The province was organized in this

work and the degree of success met with has been very gratifying. In 1918 there were thirty thousand (30,000) lbs. marketed co-operatively; in 1919 there will be seventy-five thousand (75,000) lbs. The condition of the wool was also much improved over last year.

The Dairy Division of the department has done considerable work in improving the conditions under which the cheese of the province is marketed. Last year the dairy superintendent graded the cheese put on the market and buyers agreed to purchase cheese only on this basis. This year the grading is continued and in addition the Dairy Division has organized a Cheese Board, at which all cheese will be sold at auction

and on a competitive market. The beneficial effect in enabling the farmers' cheese factory managers to sell their output to better advantage, is quite obvious, and has brought cheese prices up to a level corresponding with those received in Ontario and Quebec.

The above represents the chief activities of the New Brunswick Department of Agriculture in facilitating the marketing of farm produce. The field is a large one to work in. The proper distribution of food products is becoming a more important feature. The Canadian system of marketing is undoubtedly a wasteful one and has its effect in influencing the ultimate cost of products to the consumer.

SASKATCHEWAN

BY W. W. THOMSON, DIRECTOR CO-OPERATIVE ORGANIZATION

THE Government of the Province of Saskatchewan has always taken an advanced position with regard to the encouragement of co-operative marketing undertakings as is evidenced by the development of co-operative creameries, the Co-operative Elevator Company, the government's wool marketing project, the co-operative live stock associations, and numerous other undertakings of a similar kind. The government's assistance in these undertakings has taken different forms; in some cases the undertakings are practically operated under the direction of government officers, in others financial assistance is given, and in others only advice and instruction are supplied.

CO-OPERATIVE CREAMERIES

The first co-operative marketing enterprises launched in the province were the three co-operative creameries established in 1896 by the Dominion Dairy Commissioner. These made little progress until 1905 when the management of the creameries was taken over by the provin-

cial Dairy Branch under an arrangement whereby all the creamery companies voluntarily placed themselves under the supervision and direction of the provincial Dairy Commissioner. Under this arrangement the Dairy Commissioner engaged the managers, purchased the supplies, kept the accounts, marketed the produce, and paid the patrons. Economies were effected by purchasing supplies in large quantities and better returns were received for the butter as the quality was greatly improved due to the employment of competent butter makers and later to the introduction of the grading system in purchasing cream.

As the industry developed new creameries were established only at points where there was a sufficient supply of dairy stock to ensure economic operation and where good shipping facilities were available. This arrangement remained in effect until 1917 at which date 19 co-operative creameries were in operation, 8,126 patrons were supplying cream and the annual output of butter amounted to approximately 2,500,000 pounds.

At the 1917 session of the legislature an act was passed incorporating the Saskatchewan Co-operative Creameries, Limited. Under this act the existing co-operative creameries, were federated and provision was made to greatly extend the scope of the business handled. The act provides that the new company may acquire or erect cold storage plants and creameries at such points in the province as the directors may see fit and the government undertakes to give financial assistance in the work by a loan of 75 per cent of the cost of the plants, repayable in 20 years with interest at a rate not to exceed 6 per cent per annum. It is provided that the entire business of the company will be conducted on a strictly co-operative plan and the profits arising from the business must be divided among the shareholders and patrons upon co-operative lines. The new company has now been in operation about 18 months and three large cold storage plants have been acquired and in addition to extending the creamery work, egg and poultry marketing departments have been established. All branches of the work are developing rapidly and the success of the new company under the management of W. A. Wilson, formerly dairy commissioner for the province, is assured.

CO-OPERATIVE ELEVATORS

The Saskatchewan Co-operative Elevator Company was brought into existence as a result of the agitation carried on by the Grain Growers' Association to secure redress from evils which prevailed in the grain marketing system. In response to representations made to the provincial government a royal commission

was appointed in 1910 to inquire into matters affecting the grain trade and to advise the government as to the best solution to the problem. After making a thorough inquiry the commission presented a unanimous report recommending that special legislation be enacted providing for the creation of a farmers' co-operative grain handling organization, to be assisted by a government loan, but otherwise to be controlled by a managing body elected by the shareholders. The commission recommended that the capitalization of the system be provided by the farmers tributary to the points where elevators were needed subscribing for stock to the amount of the cost of the proposed elevators and paying in cash 15 per cent of the subscribed capital. It was also recommended that the total crop acreage of the shareholders should be not less than 2,000 acres for each 10,000 bushel capacity of the proposed elevator, thereby insuring the sympathetic support of sufficient farmers to run the elevator profitably. Upon these conditions being fulfilled the government should advance the 85 per cent of the subscribed capital still unpaid, this loan to be repayable in 20 annual instalments with interest at 5 per cent per annum.

An act embodying the recommendations of the commission was passed in the spring of 1911 and the executive of the Grain Growers' Association at once undertook the preliminary organization work. So energetically was this carried out that by the fall of 1911 the company was organized and 46 elevators had been built or purchased to handle the season's crops. The following table shows the growth of the enterprise and the development of its business since its inauguration.

Season	Number of shareholders	Number of elevators	Grain handled through elevators	Grain handled through commission
			bushels	bushels
1911-12	2,597	46	3,261,000	12,761,686
1912-13	8,962	137	12,899,030	19,290,531
1913-14	13,156	192	19,465,290	13,642,807
1914-15	14,742	210	13,764,653	39,674,000
1915-16	18,077	230	39,089,000	33,518,836
1916-17	19,317	258	32,359,725	26,554,277
1917-18	20,683	298	25,994,552	

CO-OPERATIVE WOOL MARKETING

In the spring of 1914 the Saskatchewan Department of Agriculture undertook, through its Co-operative Organization Branch, to act as a free wool marketing agency for the sheepmen of the province who would prepare their wool in accordance with directions issued by the branch and forward it to a warehouse provided by the department in Regina. It had been found from investigation that much of the wool produced in the province was not properly prepared, most of it being tied with binder twine and in many cases large quantities of chaff and other foreign matter were shipped along with the

wool. There was no large central wool gathering agency in the province and many sheepmen sent small shipments by local freight to wool dealers in eastern Canada thereby incurring high transportation charges. The department issued a pamphlet explaining how the wool should be put up and cared for and undertook to supply at cost paper fleece twine for tying the fleeces and strong, well woven jute sacks for shipping. From the first this project has met with a generous response from the sheepmen of the province and every year has witnessed a large increase in the quantities handled as is shown in the following table:—

Year	Number of consignments	Pounds	Average price per pound
			Cents
1914	179	69,404	17½
1915	318	150,328	25
1916	487	179,890	32½
1917	623	223,445	65
1918	916	394,000	61½

After the first season an arrangement was made whereby advance payments of approximately two-thirds the value of the wool were sent to producers immediately upon receipt of the shipments and in every

case as soon as the wool was sold final payments were forwarded returning to the producer everything realized from the sale of his wool less the actual cost of operating the warehouse and transportation charges.

The federal Live Stock Branch provided graders who classified the wool as it is received into the warehouse at Regina and all sales and settlements are made on the basis of the grade certificates issued by these officers.

Since the organization of the Canadian Co-operative Wool Growers, Limited, all of the wool handled by the branch has been sold through this selling agency. The department's wool warehouse is at present open in Regina and it is expected that well over 500,000 pounds of wool will be handled this season, the business being again conducted in the manner above described.

CO-OPERATIVE LIVE STOCK MARKETING

The first work undertaken by the Co-operative Organization Branch

established in the fall of 1913 was to gather information and issue a pamphlet outlining the advantages of co-operative live stock marketing. This pamphlet pointed out how by uniting to make up carload shipments and forward same to central markets, owners of small herds could secure the advantages of competitive bidding and realize the full market value of their animals, eliminating the profits to drovers and securing for each returns in keeping with the quality of his product. As a result of the distribution of this pamphlet nine co-operative live stock marketing associations were established in 1914 and the work has grown steadily since that time as shown in the following table:—

Year	Number of associations marketing live stock	Number of cars	Value
			\$ cts.
1914	9	30	42,034 22
1915	10	140	150,512 76
1916	23	241	323,171 25
1917	35	548	1,050,285 18
1918	41	689	1,558,621 14

In addition to supplying bulletins and sending out speakers to encourage the formation of stock marketing associations, the department supplies each association undertaking this work with a set of receipt and account forms sufficient to record their transactions for one year without charge and will supply additional forms at cost. During the past three years an experienced stockman has been sent to assist any new association in handling its first shipment of stock. It is found that this assistance is much appreciated both by the shippers and by the local management, tending as it does to establish confidence and when once an association has had practical experience in

stock marketing, it is seldom that it fails to continue the work.

CO-OPERATIVE STOCKYARDS

At the last session of the provincial legislature, legislation was passed establishing two co-operative stockyards, one located at Moose Jaw to serve the southern section of the province and the other at Prince Albert to serve the northern parts. The capital stock of each is fixed at \$100,000 with shares at \$100 each and at least half of the capital must be held by agriculturists. The legislation further provides that each of the companies may commence business as soon as \$60,000 worth of its stock has been subscribed and half

of the amount has been paid up. Dividends must not exceed 8 per cent per annum and the government assists the companies by a cash grant equivalent to one-third of the cost of the necessary buildings, yards, and pens. Both of the companies

have already commenced operations, the stockyards are being put into shape at present and the handling of stock will be under way at both points in time for the fall shipping season.

BRITISH COLUMBIA

BY DR. DAVID WARNOCK, DEPUTY MINISTER.

THE Vancouver Island farmers have now started an attempt to solve the meat question for the benefit of producers and consumers. The farmer's co-operative association of Victoria has opened a large meat store in the center of the city, a stone's throw from the city hall. It has nearly 1,500 sq. yards of floor space, and it is the intention to sell meat for the wholesale price plus the bare cost of handling. A large percentage of the farmers of the district are pledged to do all their business at this store. The handling of feeds, wholesale groceries, etc., will also be from this place.

The Nanose co-operative at Parksville and district, one hundred miles north of Victoria, are working with the Nanaimo district farmers in establishing a large farmers' market for Nanaimo, on a strictly co-operative share basis, principally for the purpose of selling farmer's meat direct to the consumer.

The soldier farmer settlers in the Courtenay district farther north are getting together similarly also, for the purchase of farmer's necessities. Interior stock farmers belonging to the farmer's institute are coming to the aid of the Island farmers by offering to ship car loads of cattle to be sold in the Victoria farmer's store.

This year a grant of \$750 has been given the British Columbia Wool Grower's Associations by this Department, which grant is being used largely in developing co-operative marketing of wool. While this movement is only in its infancy there is evidence of a growing interest in co-operative marketing among farmer's institutes, and it is expected that much progress will be made in the course of a year.

Provincial prairie market's commissioner, Mr. J. A. Grant, and coast market's commissioner, Mr. R. C. Abbott are giving much valuable service towards facilitating the marketing of farm produce.

MANITOBA

AGRICULTURAL REPRESENTATIVE CONFERENCE

THE agricultural representatives of the Manitoba Department of Agriculture, situated at eight different points in the province, were called together in Winnipeg for a three day's conference. The purpose of the conference was to enable the representatives to compare notes, confer with other officials engaged in

agricultural instruction and extension work, and thus gain information that will assist them in fulfilling their duties. Among the most important subjects taken up were the Manitoba Rural Credits Act and Land Settlement for Soldiers. Professor Reynolds of the Manitoba Agricultural College and members of the

staff brought to the attention of the representatives the services that this institution gives to the farming community. President Reynolds pointed

out that the work of the representatives was to popularize agricultural science which the college had imparted to them as students.

SASKATCHEWAN

DAIRY EXHIBITS AT SUMMER FAIRS

BY P. E. REED, DAIRY COMMISSIONER

THE Dairy Branch of the Saskatchewan Department of Agriculture is this year putting on a number of educational exhibits at summer fairs, especially with reference to food value of milk and the importance of individual testing and herd selection.

An exhibit is being shown giving the average production of ten "extra good" cows of one herd in the province which runs over 500 pounds of butter fat, the average production of many "good" cows which runs over 300 pounds, and the "average" production of all herds which unfortunately is still about 100 pounds. This low average is due to the fact that a great many Saskatchewan herds are only milked from three to five months during the summer, and are dry the remainder of the year. As it is practically impossible to illustrate the production of these various grades of cows by the actual butter, the required number of one-pound cartons is being used, together with posters to impress on the eye what the figures quoted in the respective cases represent in butter.

The method of testing the individual cow is illustrated and the necessary equipment, namely the spring balance, Babcock tester, sample bottles, record sheets, etc., are shown therewith.

To illustrate the food value of milk and dairy products an extensive exhibit as originally arranged by the Holstein Friesian Association of America is being shown. In this

exhibit the value of a quart of milk, a pound of butter, cheese and ice-cream is shown in comparison with the necessary amount of various other foods required to yield an equal value in nutriment for the human body.

Photographs of some of the best individuals of the dairy breeds with their records of breeding and production are included in the exhibits and a variety of educational posters displayed. Literature on subjects of cream grading, care of cream on the farm, and feeding and herd management is also distributed.

In connection with the Saskatoon fair held July 14 to 19, the Dairy Branch in co-operation with the Saskatchewan Dairy Association organized a provincial dairy rally. To accommodate the rally three large tents were erected, one of which was specially furnished as a rally and rest tent and served as rally headquarters. One of the other tents contained a number of special dairy exhibits while in the third were housed six pure-bred dairy cows loaned by the University of Saskatchewan. The most modern steel stable equipment with concrete floors was installed and the presence of these representative dairy animals with up to date stable conveniences was of itself a valuable educational feature. A further item of very great interest to practical dairymen was a milking machine demonstration given on these cows each night and morning during the fair.

ALBERTA

DR. FRANK ARCHIBALD WYATT PROFESSOR OF SOILS

BY E. A. HOWES, B.S.A., DEAN, COLLEGE OF AGRICULTURE.

DR. Frank Archibald Wyatt has been appointed Professor of Soils in the College of Agriculture. The University has been doing some work in soils during the war, the appointment of a full professor being postponed until the war was over. It is the aim of the College of Agriculture to place the work of soils on a par with that of field husbandry and animal husbandry.

Dr. Wyatt was born in Utah, and is a graduate of Utah Agricultural College. He farmed for himself in Idaho, under both dry farming and irrigation conditions. After graduation from Utah he spent four years doing graduate work at the College of

Agriculture, University of Illinois, where he obtained his M.S. (Agriculture) and Ph.D. (Agronomy) degrees. Up to the present time he has been for four years assistant professor in the Department of Agronomy. Dr. Wyatt's personal experience should make him a particularly valuable man for Alberta, where, in the southern part of the province, the best dry farming is of such paramount importance and where in many districts irrigation is being recognized as a necessary insurance factor. Broadly speaking, Dr. Wyatt's work will be divided into three parts, research work, consultation work, and academic.

BRITISH COLUMBIA

BOUNTIES FOR SHEEP-KILLING PANTHERS

REGULATIONS respecting the payment of bounties for the destruction of panthers in sheep protection districts of the province of British Columbia, have been authorized by the Lieutenant-Governor-in-Council. These regulations provide for the payment of a bounty of \$25 for each mature panther killed, and \$12.50 for each young panther

killed when not less than one week old. These regulations apply to sheep protection districts that are designated by order-in-council. Applicants for bounty are required to produce evidence to the satisfaction of the secretary of a farmers' institute in the locality of the sheep protection district in question.

EXCHANGE BULLETIN

THE Department of Agriculture of British Columbia has established in connection with its Coast Markets office, an exchange bulletin to facilitate the purchase and sale by farmers of seeds, live stock, pet stock, and second-hand machinery. The Coast Markets Commissioner will publish weekly lists of these articles and live stock

sent in by *bona fide* farmers. Articles listed will appear but once unless they are relisted. The names of the farmers listing are not published. These, the Coast Markets Commissioner will supply to inquirers who desire to purchase, who will then have the opportunity of communicating directly with the seller.

PART III

Junior Agriculture

DEMONSTRATIONS, COMPETITIONS, AND CLASS-ROOM STUDIES IN RURAL LIFE FOR BOYS AND GIRLS

HOUSEHOLD SCIENCE IN RURAL SCHOOLS

IN several of the provinces household science and manual training are being taught in rural schools. These schools are given financial assistance from funds provided

through *The Agricultural Instruction Act grant*. The work is carried on under qualified instructors in the several provinces.

QUEBEC

DOMESTIC science is taught in many convents of Quebec. Fifty-one of these institutions, under the management of nuns of various orders, each receives from the provincial Department of Agriculture, from funds provided under

The Agricultural Instruction Act, a yearly grant, provided that such institutions give a domestic science course officially recognized of good efficiency, and that they make a full report of their work three times a year to the department.

ONTARIO

A MOVEMENT is under way in the province of Ontario to extend the teaching of household science to the rural schools. In order to promote the introduction of manual training and household science into these schools, successful attempts have been made to over-

come the difficulties that have hindered progress in this direction, such as limited accommodation and resources. Substantial grants are now offered to assist school boards to purchase equipment, and equipments have been designed that take up but little space in the one-room school.

SASKATCHEWAN

IN the autumn of 1914, a Director of household science was appointed to the staff of the Department of Education and paid from *The Agricultural Instruction Act grant*. Saskatchewan is the first province in the Dominion to take this forward step.

The duties of the director include the supervision and direction of the work of teachers in training in the normal schools, the inspection of the work of high schools, and the extension of household science to the schools in rural communities.

Previous to 1915 the teaching of household science was almost entirely confined to the city schools. During that year the effort was first made to extend this work to the rural communities. Through the medium of teachers' conventions and institutes, teachers have been urged to teach

sewing and sanitation and, wherever practicable, to have the pupils prepare for themselves each day one hot dish to supplement the cold noonday lunch. Some phase of household science is now being taught in about one-third of all the town and village schools of the province.

ALBERTA

THE Alberta agricultural schools provide a course in household science. A large part of the cost of maintenance is met from *The Agricultural Instruction Act* grant.

These schools are not under the jurisdiction of the provincial Education Department and are hardly admissible under school agriculture.

BRITISH COLUMBIA

SUMMER schools for teachers are held each year in the city of Victoria. Rural science and household economics are included in the courses.

These special qualifications entitle teachers to bonuses as teachers of rural science. Free transportation to the summer school is provided.

NEW BRUNSWICK

VOCATIONAL EDUCATION

BY F. PEACOCK, DIRECTOR, VOCATIONAL EDUCATION.

IN 1918 the New Brunswick Legislature passed a Vocational Education Act. This provides that the government will bear half the expense of maintaining vocational schools, departments, or classes, if any municipality chooses to organize such, according to prescribed standards.

The act is administered by a vocational education board, composed of four ex-officio members and five others. Among the latter there must be a representative of labour, one of farming, one of manufacturing, and one of commerce. The ex-officio members are the Superintendent of Education, the Principal of the Normal School, the Deputy Minister of Agriculture, and the Director of Elementary Agricultural Education.

The vocational board was organized toward the close of 1918, and Mr.

Fred Magee, M.L.A. of Port Elgin was made chairman; Fletcher Peacock was appointed executive officer of the board, and Director of Vocational Education. He assumed the duties in this connection on May 1, 1919.

The New Brunswick Vocational Education Board believes that in order to succeed with its work it must have efficient teachers of very high standard. Its first problem is therefore to train a corps of these. Steps have been taken in this connection. First, \$1,500 has been set aside this year to pay the tuition and travelling expenses of a few selected individuals who may thus be induced to attend approved training institutions outside the province. Already three men are in attendance at two of the leading technical schools of the middle Western States,

preparing themselves for leadership in New Brunswick.

Second, a Summer School of Home Economics is being carried on to help teachers in this connection. Two leaders of eminence have been brought in from the States to supervise and instruct, and to help to outline the plans for vocational education for the girls of the province.

The policy of the board will be to open only a few type vocational schools and departments during the coming year. Evening schools and possibly day commercial departments will be organized at St. John, Fredericton and other centres. A full time vocational school will begin work at Woodstock in September

next, operating departments of agriculture, home-making, commercial work, and motor mechanics. This school is designed to serve the whole county of Carleton and is supported as follows: One-quarter of maintenance is paid by the county council, one-quarter by the town of Woodstock, and one-half by the province. The equipment is furnished by the town of Woodstock.

A persistent advertising campaign will be initiated by the vocational board during the coming fall in order to inform the people of New Brunswick generally as to the value of vocational education and the great progress that it has made elsewhere in the present century.

SASKATCHEWAN

SCHOOL EXHIBITIONS

FOLLOWING the lead of the Rural Education Association at Weyburn in organizing school exhibitions, the Rural Education Associations in nine municipalities have adopted an almost entirely uniform classification for school exhibitions. Mr. A. Kennedy, school inspector at Weyburn, has been closely identified with the development of the rural education association idea in building up the Weyburn school exhibition policy which includes the following rules:—

1. Schools subscribing fifteen dollars (\$15) per class room shall have the privilege of exhibiting the work of any or all pupils.

2. Each school, or class-room, must submit to the secretary a list of entries indicating the name and number of the school district, the name and address of the teacher, the names of the individual exhibitors, together with the age and grade of each exhibitor and the exhibits which each exhibitor is making. This list must be accompanied by a certificate from the teacher to the effect that the exhibits are the *bona fide* work or care of the respective exhibitors.

3. Each school, or class-room, must be responsible for the careful and proper tagging of each of its exhibits. Each exhibit should be tagged prior to the date of the exhibition. The tag must show in plain view the proper classification in accordance with the published list of entries.

The exhibits include class room work for each of the eight grades, including drawing, mat weaving, paper cutting, plasticine work, etc. In the school garden plots' section the classification provides for competitions in garden crops, grain, grasses, field vegetables, colts, calves, and other live stock owned by pupils. There is also a section for household and manual art including sewing, baking, preserving, pickling, wood work, and nature study sections. The classifications throughout are by school grades thus affording fairness in the district.

The executive of the rural education association of the Weyburn municipality recognize that in each district in which the school garden is undertaken, arrangements for judging individual plots should be made by the board and teacher and that a sum of money be provided to purchase suitable prizes for the pupils who are judged to have taken the best care of their plots.

BOYS' AND GIRLS' CLUB CONTESTS

At the Weyburn school exhibition and at each of two others in the

province, boys' and girls' club contests will be held. These are open to all boys and girls under eighteen years of age living within the municipality. The Council of Weyburn has appropriated two hundred dollars to be used in financing the prize list. The club contests include sections for colts, pail-fed calves, beef type calves, and litters of pigs. In each case the animals are to be less than six months old. In each case the stock must be owned and handled by the member. The prizes in each case for each class are three in number, \$10, \$5 and \$2. Classes are provided for a male and two females in Plymouth Rocks, Wyandottes, Orpingtons, Rhode Island Reds, and for any other variety of poultry; \$3, \$2 and \$1 prizes are offered in these sections.

Sections are further provided for grains, potatoes, poultry coops, trap nests and for baking, sewing, pre-

serving and canning as well as for potted plants and the judging of live stock.

The boys' and girls' club contest will be held at the school exhibition which will take place in the several municipalities in September and the early part of October. Each of the municipalities holding school fairs include a sports contest list for boys and girls. The classification is by age and weight and includes running, jumping, game contests, and similar competitions.

As a result of these school exhibitions and boys' and girls' club contests the associations are developing a municipal spirit that will welcome the municipal unit of school administration and consolidation. The sentiment in these things is growing. Greater interest is also being manifested in short courses and agricultural education generally.

SUGGESTIONS FOR SHEEP CLUBS

OFFICIALS of the extension service in agriculture at the University of Illinois have issued suggestions for the guidance of sheep club leaders. The purpose of these clubs is to assist in the education of boys and girls, to teach the proper methods of caring for sheep, and to start boys in practical sheep raising. It is proposed that classes be divided into A. and B. the former including boys and girls from ten to fourteen years and the latter from fifteen to eighteen years. Each club should consist of not less than five members. Arrangements should be made for:

- a. An adult leader
- b. An advisory committee of adults
- c. A corps of officers
- d. Regular meetings
- e. A field day or club tour
- f. An exhibit
- g. An annual report to the State leader in Junior Extension.

Each club member should:

- a. Enroll in the club
- b. Class A—Take complete charge of not less than two ewes and their lambs

from the time the lambs are born until old enough to wean or market.

Class B—Take complete charge of not less than five ewes for a period beginning not later than two months before lambing time and extending at least up to the time the lambs are old enough to wean or market.

- c. Keep records of weights, values, and sales of sheep, lambs, and wool, as may be required.
- d. Exhibit sheep at local club show.
- e. File a final report with the local club leader.

THE PLAN—BUSINESS PHASES

Sheep-club work, unlike certain other club projects should continue more than one year. Where it is most successful it will mean the establishment of flocks of sheep owned by young people and it will serve as a source of income either for further investment or for securing a higher education. In many cases the ranks of future sheep breeders will be recruited from the sheep-club boys and girls of today.

Some clubs desiring to start the sheep project will require financial

assistance. This can often be arranged through a bank, which will finance the purchase of the ewes necessary to supply the club. The loans should be made for such a period as will permit each member to repay his loan under normal conditions without interfering with the project.

If the club is to succeed, the leader should see to it that good, healthy animals are secured, and that each member is properly equipped to care for the ewes and lambs.

EDUCATIONAL PHASES--ORGANIZATION

A club of young people should eventually stand on its own feet and a successful club leader will gradually "work himself out of a job". The sheep project may be one of the projects chosen by a community club of young people, or it may be the sole project selected. In most cases, successful sheep clubs will belong to the latter class.

The leader may be an experienced sheepman, a teacher, or someone accustomed to working with young people. A combination of the first and either second or third makes an ideal leader. If the leader of the club is not a sheepman, he should at least have the best sheepman in the community as one member of his advisory committee.

BUYING AND SELLING COMMITTEE

The regular officers of the club, acting under the direction of the

leader and the advisory committee, will constitute a "buying and selling committee". This committee may have charge of the purchase of the ewes and rams, of the care and disposition of the rams, of the sale of the wool and the surplus lambs, and of the distribution of all proceeds from sales. A division of the work of this committee may be made upon some such basis as the following:

The president of the club shall act as chairman of the committee and as such shall call all committee meetings and sign all orders or checks. The treasurer shall be the custodian of all funds, shall collect all ram fees, and shall make no payment except upon a written order of the secretary, signed by the president. The secretary shall conduct all correspondence relative to buying and selling and shall notify members of such matters as collection of fleeces or lambs for shipment, and other matters decided upon by the committee.

Meetings should be held at least once a month, on a regular day, at an hour agreed upon by the members. At the opening of each meeting the secretary should call the roll and each member should report from his record book the progress of the project, such as the number of lambs born, the amount and cost of feed, the number of hours of labour, the weight of wool, etc. The secretary will keep a record of these reports.

"The fundamental purpose of agricultural education is the development of agriculture as a permanent, productive, and profitable occupation, and of the agricultural people as an important part of the social and political fabric."

PART IV

Special Contributions, Reports of Agricultural Organizations, Publications, and Notes.

SERVICES OF CANADIAN SEED GROWERS' ASSOCIATION IN FACILITATING MARKETING OF SEED

BY L. H. NEWMAN, SECRETARY

THERE are several hundred seed growers in Canada affiliated with the Canadian Seed Growers' Association either as *bona fide* members or as growers seeking admission to full membership. These growers produce annually many thousands of bushels of registered and improved seed. The association employs a system of inspection by means of which it is able to vouch for all seed which is good enough to be used for seeding purposes. Equipped with this information the association issues annually a seed catalogue, containing the names and addresses of all growers offering seed for sale, the variety and quantity offered, the price asked, the percent germination, the certificate number (in the case of registered seed) and some general remarks *re* the quality of each lot. These catalogues are distributed widely throughout Canada and to some extent in the United States and in other countries. They go to all the larger Canadian seed dealers as well

as to farmers' clubs and other institutions and organizations which may be interested in purchasing seed. Preliminary price lists are also sent to the larger seed dealers and farmers' clubs a couple of months before the regular catalogue appears in order to give these wholesalers an opportunity to get in touch with growers sufficiently early in the season.

PUBLICITY.

Publicity is also given the products of Canadian Seed Growers' Association members through exhibitions which are held in most provinces each year. Further attention to the work of the association is drawn by means of press articles and annual reports, all of which assist in creating a demand for registered seed.

As a result of the above organization foreign countries are becoming interested in the products of our Canadian growers and are endeavouring to secure stocks for trial.

ASSOCIATIONS AND SOCIETIES

EVENTS OF THE COMING MONTHS

September 6-13. Western Fair, London, Ont. Secretary A. M. Hunt, Western Fair Office, London.

Aug. 23 to Sept. 6.—Canadian National Exhibition, Toronto; General Manager, John G. Kent.

Aug. 28 to Sept. 6.—Quebec Provincial Exhibition, Quebec; Secretary, Georges Morisset.

Sept. 6 to Sept. 15.—Central Canada Exhibition, Ottawa; Manager and Secretary, James K. Paisley.

VEGETABLE GROWER'S ASSOCIATION OF AMERICA

The annual meeting of the Vegetable Growers' Association of America will be held in Detroit, Michigan, from September 9th to 12th. This organization has in its

membership many Canadian vegetable growers. The secretary of the association is Samuel W. Severance, Louisville, Kentucky.

CANADIAN FERTILIZER ASSOCIATION

A conference of the members of the Canadian Fertilizer Association was held at Guelph on June 19 and 20. About one hundred members attended. The conference was arranged by Henry G. Bell, Director of the Soil and Crop Improvement Bureau of the association, who, when opening the conference, brought out the point that Ontario can increase the value of her crop production many hundreds of thousands of dollars, if not millions of dollars, by close attention to the factors that constitute the best methods of farming. The business of the conference was to give the members of the association the advantage of learning the results of investigations that have been carried out at the college in the use of fertilizers.

Professor Robert Harcourt, head of the chemistry department, addressed the conference on various subjects having to do with the actual feeding of farm crops, and explained the plans in progress in the soil survey work now being carried on in the province. Dr. Zavitz outlined the developments in field crop production in Ontario and demonstrated the experimental work which has made Ontario Agricultural College famous the world over. Professor Jones dealt with the relationship of the micro-organisms in the soil to crop production, while Professor Leitch summarized the work being done with reference to better farm management.

PRINCE EDWARD ISLAND STOCK BREEDERS' ASSOCIATION

At a meeting of the Prince Edward Island Stock Breeders' Association, recently held in Charlottetown, it was decided to hold a winter fair and horse show next winter. Owing to limited accommodation these shows

will be held separately, the winter fair in December, and the horse show after the New Year. It was decided to demand that all cattle admitted for exhibition purposes should be free from contagious diseases.

WORK OF QUEBEC HOMEMAKERS' CLUBS

MISS. R. M. PHILP, SUPERINTENDENT.

Now that the acute need for definite war work no longer exists, the Quebec homemakers' clubs are again devoting their energies to their original objectives. Their constitution reads as follows: "The object of the homemakers' clubs shall be to study the most scientific way of conducting home work in order to economize, strengthen, and preserve the health of the family; to discuss the best expenditure of money in order to secure the highest conditions of home life; to provide better financial, social, and intellectual advantages for farm boys and girls and yet keep them on the farm; to carry on any line of work which has for its object the welfare of home or community life." The clubs are endeavouring to carry out the first item in this object by giving part of their year's programme to the study of food from the aspects of the requirements of the body, the value of specific kinds of food (as cheese, fruit, etc.), the feeding of children, the proper care of milk, food for the sick, etc. The second item is studied from the viewpoint of account keeping, economy in food preparation, and in the management of the household

through reducing labour by systematic planning and the use of labour-saving devices. The third item is dealt with largely through the schools. Prizes are given for competitions in essay writing on patriotic subjects and the study of poetry and literature. School lunches are receiving a great deal of attention, and in a number of rural schools equipment for serving hot cocoa at noon has been supplied, adding to the social side of school life as well as promoting the health of the pupils. School grounds are being improved and much help given to school fairs. Musical instruments have been provided for several schools and it is proposed to further encourage music in the schools not only in this way but by planning means for vocal instruction. Flags for schools and equipment for games have also been given. Several junior clubs have been formed among the girls and others are planning to organize. It is hoped to interest the girls in some form of productive work, such as canning clubs, where they may remain at home and yet have an opportunity of earning for themselves.

The last item has many and varied applications depending on the needs and interests of the often widely separated communities. Many clubs are devoting part of their time to the study of questions of broader interest, e.g., laws for women, principles of government, history and geography of the province, biographies of notable persons. Work in relation to this part of the object is taking such forms as the promotion of social intercourse through interclub debates, assistance to public libraries, donations to hospitals, co-operation with other organizations in the purchase of a community hall, re-furnishing and providing musical instruments for such halls where already in existence; co-operating in the purchase of a road sprinkler. New plans for the current year embrace such objects as the establish-

ment of a centre for hospital supplies in districts where no hospital is in existence, and providing the necessary equipment which will be at the disposal of local physicians, placing of watering troughs along a public highway, planning for rest-rooms for rural women in marketing centres, beautifying and care of cemeteries, establishment of a community recreation park and the planting of trees thereupon in memory of soldiers, and the encouragement of healthful community recreation.

It is hoped also to assist worthy objects outside the bounds of the community, and the needs of institutions for orphan children, fisherfolk on the Labrador, and the devastated areas of Belgium are receiving consideration.

THE ONTARIO CORN SHOW

At the June meeting of the directors of the Ontario Corn Growers' Association, the date for the next corn show was set as January 13th, 14th, 15th, and 16th, 1920. A local poultry association has been formed in

Chatham, which intends holding a show in conjunction with the corn show on the above dates. The secretary of the corn show is P. L. Fancher, B.S.A., Chatham, Ont.

CONFERENCE OF POULTRY INSTRUCTORS AND INVESTIGATORS

A meeting of the American Association of Instructors and Investigators for Poultry Husbandry was held in Guelph on July 2nd, 3rd and 4th. Most of the states of the Union were represented, as well as Saskatchewan, Manitoba, Ontario, Quebec, and New Brunswick. The purpose of the meeting was to get together, compare notes, and review and consider research and departmental methods and policies. A resolution

was passed concerning the appointment of a committee on uniform methods of egg laying contests and a committee on research having to do with demonstrating the usefulness of eggs as human food. The president of the association is Professor Kirkpatrick of Storrs, Conn.; first vice-president, Dr. O. B. Kent, Cornell University, and the secretary is Professor Henry Lewis, New Brunswick, N.J.

MILCH GOAT ASSOCIATION OF MANITOBA

BY J. R. YOUNG, SECRETARY

The Milch Goat Association of Manitoba was formed in January, 1919. Already fifteen members have paid their fees and a much larger membership will undoubtedly be attained very soon. There are few well bred goats in Manitoba. Plans are being made for the importation of a car load of good animals to sell to the members. It is probable that the provincial Department of Agriculture will assist the movement to the extent of inspecting the stock before it is purchased and also financing the shipment until it reaches Winnipeg.

The constitution provides that the Milch Goat Association of Manitoba shall be managed by a board of seven directors elected by ballot at the annual meeting. A president, vice-president, secretary, and

treasurer shall be elected from the board. The board shall have power to expel or suspend members whose conduct is prejudicial to the existence of the association.

The object of the association shall be to promote the breeding and improving of high grade and pure bred milch goats in the province of Manitoba and to promote and assist, wherever advisable, public exhibitions of milch goats in order that the people may become better acquainted with them and their advantages. There shall be two classes of members. Active members shall pay the full fee of \$2, payable in advance; honorary members shall be elected by the association. Regular meetings shall be held on the first Monday of each month.

CATTLE BREEDERS' SALE

At a joint meeting of the Saskatchewan Hereford Breeders' Association and the Saskatchewan Aberdeen Angus Association it was proposed that the sale of cattle held by the Saskatchewan Cattle Breeders' Association next spring should occupy four

days, two days of which would be given to the sale of Shorthorns, and one day each to the sale of Herefords and Aberdeen Angus animals, each sold separately.

ALBERTA WOMEN'S INSTITUTE ACTIVITIES

Women's institutes are very active throughout the province this year and their activity takes various forms according to the particular needs of the community. Social and educational work is much the same all over the province but their special local activities are governed by the particular circumstances of the locality.

The central office is in touch with all the institutes by means of the short courses now being held. Seven of the public health nurses are out now giving instruction in regard to public health. Four of the household science teachers of the agricultural schools are giving courses of that nature where requests have been made. A rally of all the women's institutes in the vicinity of Calgary was well attended and it afforded an opportunity for the women to get better acquainted and also to hear the address of the provincial president, Miss Isabel Noble.

The local activities are numerous and varied. At Islay the women, who were anxious that nothing should happen to prevent the carrying out of the municipal hospital scheme, made a strong effort in its behalf and succeeded in carrying the by-law, fourteen to one. At Czar the institute is equipping a room in the school as a household science kitchen. In the Olds constituency the committee is providing Perry pictures for all the schools in that constituency, thus

providing some of the best reproductions to educate the children in art. At Clearview the school has been equipped with pencil-sharpeners, enamel chalk, window curtains, et cetera. Many other institutes are similarly adding to the attractiveness and comfort of their schools. At Bawlf the institute is providing a park in the centre of the town and in this they are planting a memorial tree for every boy who went overseas from the district. The same idea is being carried out by the Cardston women's institute. At Round Hill and Huxley they are building memorial halls that will provide a place for community meetings.

There are also very praiseworthy efforts being put forth by some of the institutes to Canadianize all women in their localities. The women of the institute have solved their situation by making it a custom to visit every newcomer who comes to the neighbourhood and showing them that they belong there. For those who do not know the English language the women's institutes undertake to teach them and at the same time members attempt to become conversant in the language their pupils may offer in return. These and many other activities are engaging the attention of women's institute members throughout the province of Alberta this year.

BRITISH COLUMBIA WOMEN'S INSTITUTES

Although there has not been quite the co-operative effort between the institutes that was hoped for, still the present indications are that the co-operative idea is growing and that very soon different groups of institutes will act in the combined movement for the betterment of public welfare.

Three institutes have reported successful efforts towards improving school surroundings and water supply, also providing much needed play ground equipment. This movement, although still in its infancy, promises well and it is hoped that many others will take up this work to make our school houses and grounds the beauty spots of the community, being lessons in sanitation, beauty and education.

Only one institute has carried out the "canning centre" idea. But in this

instance it has proved a most successful undertaking and another canning outfit is to be added making three in all operated by this one institute. Several institutes have reported efforts towards establishing community canning.

The line of work which as a universal project seems to appeal most to the institutes at present is the establishing of the district nurse, which will include school nursing. Fully half of the institutes have reported attempts along this line. At a district conference of the Vancouver Island institutes in 1915, Miss Mary Ard MacKenzie, then chief superintendent of the Victorian Order for Canada, addressed the delegates on the work of the nurse in rural districts. Although several institutes discussed the possibility of securing such nursing service for their various districts, only one actually organized

and secured a nurse. This institute operates in Saanich municipality adjoining the city of Victoria; the work, however, was not finally established until April, 1917 when the first nurse went on the district, the duties were soon found too heavy for one and a second was engaged coming on duty August st. Since that date a car has been added which besides carrying the nurses on their duty, is used to convey patients to and from hospitals or doctors' offices, incidentally, weary pedestrians are picked up and given a "lift" so much appreciated on country roads, and during the "lift" the nurse never fails to swing the conversation on to the all important subject of "district nurse". These "lifts" and conversations have been rich in results as many calls have come for the nurses' services directly due to the information given and kindly interest shown by the nurses on these occasions.

Right along this line of work there may be mentioned the co-operation of four institutes in holding the child welfare exhibit at one common centre under the auspices and direction of Rev. Hugh Dobson. The reports of all the four institutes are unanimous in declaring that the success of this was beyond question, many mothers receiving valuable information. The financial end was borne by the institutes without any hardship. One other institute in a large centre also handled this exhibit, without any difficulty financially, with the same success.

The study of civics is another branch to which most of the institutes are very profitably devoting some of their time at their regular monthly meetings. The "Busy Woman's Hand Book" which has been recommended by the department, is used as a basis of this study.

BRITISH COLUMBIA FARMERS' INSTITUTES

The farmers' institutes in British Columbia, perhaps more than in any other province in Canada, have regarded co-operation as a prominent feature of work. The members have been able to purchase co-operative stump powder, stump pullers and outfits, and pure bred live stock. Through the medium of the Department of Agriculture, blasting powder that would cost \$11 a case is readily secured by the members at \$8.42. In addition to this an advantage is also gained in the transportation of this material. In the purchase of stump pullers and stump outfits members of the institute are able to secure machines on special discount on payment in three equal annual instalments without interest, the first payment on delivery of the machine, the second one year from the date of delivery and the third at two years. Interest at ten per cent is charged on overdue accounts. The transportation charges from the factory are paid for the members by the institute.

For a number of years the Live Stock Branch of the Department has been supplying pure-bred sires to institutes, and noticeable improvement in the herds and flocks of the province is evident. Holstein, Jersey, Ayrshire, or Guernsey bulls are supplied upon requisition from an institute upon the following terms: payment to be upon three equal instalments without interest, the first payment to be made upon delivery; the second, one year from date of delivery; and the third at two years from said date. The Live stock Branch pays all transportation charges and issues instructions as to the care and management of the bull until payments are made. Registration papers are held by the branch until payments are completed.

Rams, boars, and bucks are supplied by the branch on very similar conditions, the only difference being that the payments are made by two equal instalments without interest.

THE BRITISH COLUMBIA TRAFFIC AND CREDIT ASSOCIATION

An organization designated the British Columbia Traffic and Credit Association has been formed in British Columbia. The purposes of this association are the advancement and protection of the fruit, vegetable, and kindred industries of the province. Following are the means by which the objects will be sought:

(a) By compiling information for the benefit of members in respect to all transportation matters.

(b) By adjusting, or assisting to adjust, any losses, differences, or disputes which may arise between members and carriers, or others, in respect to fruit, vegetables, and other produce in transit or otherwise.

(c) By co-operating with the shippers of British Columbia, and others, to obtain improved transportation facilities for fruit, vegetables, and other produce.

(d) By co-operating with the shippers, and others, to improve the quality of the products; to standardize packing and grading; to introduce improved methods of packing and shipping.

(e) By adjusting, or assisting to adjust, on behalf of members any dispute which may arise, whether in respect to quality, or from any other cause, either between members, or between members and any other person or persons, corporation or corporations.

(f) By compiling for the benefit of members information in respect to home and foreign markets.

(g) By assisting the shippers of fruit, vegetables, and other produce of British Columbia in any other way that may be deemed advisable.

(h) By co-operating with shippers, and

others, in any other matters which may advance or protect the fruit, vegetable, and kindred industries of British Columbia.

The president of the association is C. L. Lowe, Vernon; vice-president, B. McDonald, Kelowna; secretary-treasurer, R. M. Winslow, Vernon; formerly secretary of the British Columbia Fruit Growers Association.

THE POULTRYMEN'S UNION OF BRITISH COLUMBIA

The Poultrymen's Union of British Columbia, the purposes of which were published in the March 1919 *Agricultural Gazette* on page 289, has evolved a system which it is claimed will provide a sound and strong basis of financing and also enable those with large and small flocks to participate and insure equity so far as benefits and representation are concerned.

Locals of the Poultrymen's Union are being organized as a medium through which all bona fide producers may obtain membership in the central association and arrange-

ments as to warehouses accommodation and expert management are being completed.

The movement had its inception in the district of Hammond. The commercial poultrymen of this section held a series of meetings and subscribed funds towards the work of the association. Chilliwack, Central Park and Duncan have taken similar action.

The president of the union is Mr. M. H. Rutledge, Sardis; vice president, J. A. Thurston, Central Park. These representatives together with the secretaries of the local unions constitute the board of directors of the Poultrymen's Union.

NOTES

Tenders for the three agricultural schools at Raymond, Youngstown and Gleichen, Alta., were opened at Edmonton on June 19th. The successful tenders aggregated \$180,419 and were awarded to three Alberta firms.

With a view to standardizing the best methods in beekeeping, and developing a spirit of co-operation among apiarists, district or county demonstrations are held in Ontario. At a meeting thus held in Middlesex county the handling of cases of foul brood was demonstrated.

To enable a group of farmers in Huron county to become familiar with the value of the hydro-electric system for farm power purposes, the agricultural representative for that county accompanied them on a tour of inspection of farms on which it is used in the counties of Middlesex and Oxford.

By a system of trap nesting and the keeping of careful records, Mr. M. C. Herner, professor of Poultry Husbandry at the Manitoba Agricultural College, found that in one season in a flock of 325 pullets one hundred laid more than 100 eggs, twenty-five laid more than 175 eggs and four laid more than 200 eggs. Of the remaining hens that laid less than 100 eggs there were some that laid only three, and two that did not lay any eggs at all.

The new superintendent of the Dominion Experimental Farm at Indian Head is N. D. MacKenzie, B.S.A., who graduated from the Ontario Agricultural College in 1909. After graduation Mr. MacKenzie was for some time agricultural representative in Glengarry county, Ontario. He served overseas from 1915 to 1917 and until his new appointment he has been assistant superintendent of the experimental farm at Brandon, Man.

The membership of the British Columbia Goat Breeders' Association increased 40 per cent during 1918 and now totals 347 members. The number of goats of all kinds in the province is now approximately 3,000, and are most numerous around Vancouver where they are popular with small holders. The aim of the association is to keep goat breeding in this province on a substantially successful basis with due attention to the paramount importance of pure bred stock.

The Official Record of Holstein-Friesian cows states that during the month of June the official tests of 78 cows and heifers were accepted for entry in the Record of Merit. During the same time 9 cows and heifers qualified for entry in the yearly Record of Performance test. In the mature class Jemima Johanna of Riverside becomes the champion of Canada for all ages and breeds, with 1280 lbs. of butter and 30373 lbs. milk. This is a world's milk record for a cow over ten years of age.

Professor L. S. Klinck, formerly Dean of the College of Agriculture, has recently been appointed President of the University of British Columbia. Professor Klinck is a graduate of the Ontario Agricultural College and subsequently pursued advanced work at the University of Minnesota and the Iowa State College. Before coming to the University of British Columbia in 1914 he was

for nine years engaged in highly successful work at Macdonald College. He is a plant breeder of wide reputation and is known especially as the originator of superior new varieties of corn, alfalfa, and soy beans which were produced at Macdonald College, Que., having since come into commercial use. Professor Klinck is a native of York county, Ontario.

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PART V

The International Institute of Agriculture

FOREIGN AGRICULTURAL INTELLIGENCE

All communications in regard to this section should be addressed to T. K. Doherty, International Institute Commissioner, Department of Agriculture, West Block, Ottawa.

SCIENCE AND PRACTICE OF AGRICULTURE

GENERAL INFORMATION

- 146—**The Products of French West Africa.**—FRANCIS G., *Department of the Colonies Colonial Office*, 156 pages, Melun, 1918.

Gives descriptions of the different parts of French West Africa from the agricultural point of view, and a detailed account of different products, such as textile and fibre plants, cereals, rubber, woods, gums, tropical fruits, live stock, fish, etc.

- 148—**Nitrogen Requirements of the Human Organism.**—In *Comptes Rendus des Séances de la Société de Biologie*, LXXXI, No. 22 p.1163-1164, Paris, Dec. 1918.

The meetings of the Commission resulted in reaching the following conclusions: (1) Albuminoids are necessary in nutrition not altogether as such, but on account of the amino acids they contain. The requirements of the organism can be accurately ascertained only by means of a detailed complicated qualitative analysis. (2) Physiology cannot yet establish such an analysis; only a few factors are known; these definite needs of amino acids are imperative but quantitatively very feeble. The vitamins are a particular case of that general rule. (3) With a diet sufficient from the point of view of energy and chosen especially with respect to the quality of albuminoids, the daily portion of albuminoids may be reduced to a very low point. (4) In practical nutrition and food problems such results cannot be taken as a basis. A sufficient total ration of albuminoids must be adopted to satisfy all detailed needs. (5) Taking account especially of ethnographical observations, which have the merit of being natural experiments, bearing on an enormous number of individuals and many generations, there can be fixed as an exigible minimum for the maintenance of the adult, according to the formula given by Lapreque in 1894, one gram of albuminoids per day and per kilo-

gram of body weight, it being well understood that the need of energy is covered by other means. (6) This rule pre-supposes the mixed diet; in a strictly vegetarian diet the quality of albuminoids must be analysed; for instance, the rice diet alone appears insufficient. (7) The case of the man at work does not require any particular attention, the work not consuming albuminoids and, moreover, all increase of the ration entailing ipso facto increase in the portion of albuminoids. (8) Children, youths, pregnant women, wet nurses, that is to say, directly or indirectly, organisms in growth, must be the object of particular solicitude from the point of view of nitrogen when food is scarce. It is prudent to give them, over and above the ration above mentioned, a small portion of animal albumen.

CROPS AND CULTIVATION

- 152—**The Relation of Climate to Agriculture in Michigan.**—DEWEY, A. S., in *Thirtieth Annual Report of the Michigan Experiment Station*, pages 683-715, Lansing, Michigan, 1917.

The presence of the Great Lakes has a great influence on the climate of Michigan. On the whole the climate of Michigan is not extreme in temperature, either in summer or winter, the rainfall is sufficient for most crops, the greater portion of the years' supply falling during the growing season. The annual rainfall is over 30 inches, while in the Dakotas it is less than 20 inches; the cloudiness is greater in winter and less in summer than in regions remote from the Great Lakes; the humidity is rather high throughout the year, especially on the lake shores. Severe local phenomena such as hail, tornadoes, torrential rains, etc., occur infrequently.

Corn is grown to a considerable extent in Michigan, but at least in the northern portion it is not grown as successfully as in the "Corn Belt" states. The plant requires a rather long frostless season, with warm

nights for best results, and these conditions are not found in the northern portion of the state. The crop will mature in 100 to 120 days when the weather is sufficiently warm, but 120 to 130 days are necessary to ripen it well if the weather is cool. In the peninsula between Lakes Superior and Michigan, and in the interior of the peninsula between Lakes Michigan and Huron, the frostless season is less than 120 days, making it difficult to grow corn successfully.

Winter and spring cereals give good yields in all parts of the state. The snow covering is usually sufficient to protect winter plants, but alternate freezing and thawing when the ground is bare occasionally causes damage.

A narrow strip of the State extending along Lake Michigan is especially adapted to fruit and has been given the name of the "Fruit Belt". Among the climatic conditions found in this section that are favourable to fruit growing are: (a) the continuation of cool weather into late spring which tends to retard the opening of fruit buds until danger from late frosts is past; (b) unusually clear and not too hot summer weather, which produces good colour and flavour in the fruit; (c) prolonged, cool falls, with freedom from early frosts, which tends to ripen up the wood properly; (d) a moist atmosphere and freedom from extreme cold in winter which prevents winter injury.

It has been noted that the yield of potatoes is directly proportional to the July rainfall. In 1916, for example, the rainfall in Leelanau county was about two inches and the average yield 130 bushels per acre, while in Kalkaska county nearby, the rainfall in July was little over half an inch, and the yield of potatoes about 20 bushels per acre. The yield of corn has been found to be affected the same way by the July rainfall.

163—Chemical Criteria and Physical Classification in Relation to the Productivity of Soils in California.—BURD, J. S., in *Soil Science* Vol. V. No. 5, p. 405-419. Baltimore, 1918.

Fourteen soils, of which 6 were silty clay loams and 8 fine sandy loams, were submitted to: (1) mechanical analysis; (2) chemical analysis by different methods (fusion method, hydrochloric-acid extraction, citric-acid extraction and water extraction; (3) experiments in crop growth under controlled conditions. The relations between the analytical results and the productivity of the soils were then determined.

Conclusions.—Low figures by water extraction and to a lesser extent by citric-acid extraction are shown to be in general accord with the soils' crop producing power.

Except in the case of highly silicious soils, the complete analysis and hydrochloric extractions are held to be worthless as criteria of present production or probable endurance.

The great variation in crop yield and in the figures for water extractions, within a given series and class (soil type) indicates that physical classification into types is inadequate as a means of predicting probable yields or determining fertilizer requirements. It would aid only in indicating the general methods of mechanical treatment.

To be of any great value to the farmer, the physical classification must at least be supplemented by extended data as to crop history and preferably by the application of chemical and biological criteria to each individual soil. These latter must be the most important function in any adequate investigation or survey with the possible exception of those cases in which the soils examined represent great extremes of chemical composition and physical texture.

182—The Selection of Cereals at the "R. Stazione Sperimentale di Granicoltura" Rieta, Italy.—STRAMPELLI, N., in I. *Bollettino degli Agricoltori Italiani*, Year XXIII, Nos. 10 and 11, p. 417-421, Rome, 1918.—II. *R. Stazioni Sperimentale di Granicoltura in Rieti, Il Frumento "Carlotta Strampelli" nell' anno agrario 1916-1917; Relazione a S.E. il Ministro per l'Agricoltura*, 110p. Terni, 1918.

During the past two years, the "R. Stazioni Sperimentale Granicoltura" produced, by hybridization and selection, several important new varieties of cereals; besides, several varieties still under investigation in 1916, were submitted with success to field trials and were favourably received by farmers.

The hybrid "Rieti" x "Massy No. 367", named "Carlotta Strampelli", is a wheat noted for its resistance to lodging and rust, its adaptability to different climates and soils, and its high productivity. At the Rieti experimental farm it produced during a period of eight years over 61 bushels per acre. For the past four years it has been grown by many farmers and by several agricultural institutions, and it has everywhere shown its superiority to all other varieties of native or foreign wheat.

The author also gives the results of experiments with other varieties of wheat and with corn.

183—"Hundred Day Wheat," Produced by Hybridization and Selection at Nages, France.—VIEULES, G., in *Revue internationale de Génétique* Year V, No. 7, p. 195. Nages, France, 1918.

The author gives the results of experiments in selection of wheat made at the Institute of Genetics at Nages. The following characteristics were considered in the experiments: earliness, resistance to diseases, resistance to frost.

Earliness.—The season of fine weather covers, at Nages, on the average about 100 days from May 10 to August 10, hence, to obtain complete ripening and a good

harvest it is absolutely necessary to shorten the growing period as much as possible.

To produce a series of "hundred day wheats" was the principal object of the plant breeders. But the spring wheats experimented on at Nages from 1907 on, all required a growing period of 150 to 165 days. It was therefore necessary to reduce the period by 50 days, practically by one-third. The results so far obtained show without doubt that complete success will soon be obtained.

Resistance to Disease.—In the valleys of Nages the damp weather in June and July causes extensive rust infection every year. In his work of hybridization and selection the author used types or varieties very resistant to *Puccinia*, and after ten years of breeding, all the "hundred day wheats" passed through the season of 1917, when rust was very prevalent, absolutely unscathed. The immunity of these wheats is due not only to their earliness which causes them to pass quickly through the critical period but also to the structure of the blades which give no hold to the mycelium of the parasite.

Besides, the new wheats seem to be very resistant to smut, black rust and lodging.

Resistance to Low Temperatures.—Spring wheats which grow from May to September escape the action of low winter temperatures. But to provide for the needs of elevated and mountainous regions the author undertook to produce a spring wheat that might be also used as a winter wheat; as a spring wheat to be sown in the second half of May and harvested in the first of September; as a winter wheat to be sown at the end of August, the flowering period to be about the end of May, and the crop to be harvested early in July.

To increase the power of resistance to cold of the new varieties recourse was had to Himalaya wheat and to several varieties from the provinces of Alberta and Saskatchewan growing north of the 53rd degree.

Possible Distribution of the Wheats.—The "one hundred day wheats" succeed in the salty soils of Camargue where they ripen in about 85 days, and on the slopes of the Alpine valleys to an altitude of 5,300 to 5,600 feet. Originating in light soils, they do not succeed so well in heavy lime soils or in clayey soils.

186—Selection of Oats Resistant to Rust in the United States.—PARKER, J. H., in *United States Department of Agriculture, Bulletin No. 629*, 16 pages, Washington, 1918.

In the United States two kinds of rust, *Puccinia lolii avenae* McAlpine (crown rust) and *Puccinia graminis avenae* Erikss. and Henn. (stem rust) cause considerable damage in the oat fields every year.

The article gives the results of inoculations on different varieties of oats in greenhouses in order to offer a basis for making selections and crosses to produce improved

oat varieties resistant to crown rust and suitable for culture in oat growing regions.

The greenhouse tests were made because in ordinary field trials no proper judgment can be made of the degree of immunity of a variety. For example the Sixty-Day and Kherson varieties, recommended as rust-resistant, were proved by the experts not to be so, their apparent immunity being due to their early-ripening habit. The employment of these two varieties in crossing might therefore cause disappointment.

In the experiment 3,286 inoculations were made on seedlings or on headed plants. Unquestionable resistance to stem rust was present in two varieties, White Tartarian and Ruakura Rustproof. Several varieties of the red-oat (*avena sterilis*), including certain strains of Burt, Cook, Appler, Italian Rustproof, Red Rustproof and Turkish Rustproof are very resistant to the crown rust. The variety Ruakura Rustproof alone was resistant to both kinds of rust.

Rust resistance is shown to be specific, for many of the varieties which are resistant to crown rust are susceptible to stem rust under identical conditions.

The results obtained by the experiments furnish the plant breeder with precise data for the selection of material for field experiment.

LIVE STOCK AND BREEDING

228—The Milch Goat in California.—VOORHIES, EDWIN C., in *University of California, Agricultural Experiment Station, Bulletin 285*, University of California Press, Berkeley, 1917.

The Bulletin summarized contains: (1) General information on the breeds of milch goats in California—Toggenburg, Saanen, Nubians or Anglo-Nubians; (2) Composition of goats' milk. Analyses made at the Geneva, New York, Agricultural Experiment Station showed the following average percentages (with the maximum and minimum percentages in brackets): fat 3.82 (1.80-8.40), total solids 12.12 (9.22-17.63), total proteins 3.21 (2.24-5.21), casein 2.40 (1.56-4.06), ash 0.55 (0.40-0.80), specific gravity 1.0294. The analyses made at the California Agricultural Experiment Station showed: water 88.05 (85.5-91.5), total solids 11.95 (9.5-14.8), fat 3.40 (1.7-5.6), solids fat 8.55 (7.8-9.27). (3) Uses of goats' milk—direct consumption—cheese—condensed milk—ices—butter. (4) Immunity to disease. (5) Care and feeding of milch goats. (6) Future possibility of goat raising in California. (7) Results of Experimental work on five Toggenburg goats at the California Station. The following are the totals for each goat: Length of time under observation: 310-312-245-336-336 days—average live weight during the period of observation: 104-127-119-95-86 lbs.—milk produced: 1283.3-2158.0-1118.0-1553.2-1341.6—Consumption of milk, per

cent: dry matter 12.88-11.9-12.37-11.3-11.3 fats 3.88-3.37-3.64-2.89-2.88—feed consumption: 168.1 lbs. of grain, 648.6 of alfalfa hay, 2556.5 of green alfalfa, 77 days of pasturage—615.6 lbs. grain, 672.7 alfalfa hay, 2147.9 green alfalfa, 74 days of pasturage—28.0 lbs. of grain, 682.6 alfalfa hay, 2556.5 green alfalfa, 14 days of pasturage—435.7 lbs. grain, 961 alfalfa hay, 119 green alfalfa, 164.5 days pasturage—301 lbs. grain, 907 alfalfa hay, 94 green alfalfa, 175 days pasturage; total feed units furnished by the feeds: 862.4-1264.2-642.0-1081.4-933.0; total units per 100 lbs. of milk: 67.2-58.5-57.4-69.6-68.1—feed units per 1 lb. of milk fat: 17.3-17.3-15.8-24.0-24.1.

Some of the concentrate mixtures fed at the University Farm are as follows: (1) rolled barley, wheat bran, dried beet pulp, cocoanut meal, in equal parts by weight. (2) dried beet pulp (6 parts), rolled barley (1 part), wheat bran (1 part), cocoanut meal (2 parts). (3) dried beet pulp, wheat bran, oats, cocoanut meal, equal parts. (4) dried beet pulp (3 parts), rolled barley (1 part), and wheat bran (1 part).

In calculating the cost of feeding the goats the following average prices were assumed per ton: barley \$29.50, corn \$29.50, oats \$34, linseed oil meal \$38.50, cocoanut oil meal \$24, dried beet pulp \$22, wheat bran \$27, alfalfa hay \$10.50, green alfalfa \$2.50, pasture per month 20 cents. Based on these prices the average cost of feeding a goat for a year amounts to \$11.24; the cost of feed per gallon of milk is 6.4 cents, and the cost of feed per lb. of fat 22.9 cents. In the case of 73 cows, records of which were kept at the same experiment station, the average cost of feed per gallon of milk was 8.3 cents, and of a pound of fat 24.4 cents. The production of goats' milk is therefore more economical than that of cows' milk.

229—Digestion Experiments With Pigs in Illinois, With Special Reference to the Influence of One Feed Upon another, and to the Individuality of Pigs.—GRINDLEY, H. S., CARMICHAEL, W. J., and NEWLIN, C. I. in *University of Illinois Agricultural Experiment Station, Bulletin* No. 200, p. 56-94. Urbana, Illinois, May, 1917.

The objects of the experiments were as follows: (a) to determine the influence of one feed upon the digestibility of the nutrients of another feed; (2) to study the individuality of pigs as to the thoroughness with which they digest their feed; and (c) to determine the coefficients of apparent digestibility of the nutrients of the following 6 rations: wheat flour middlings—ground corn—ground barley—wheat flour middlings and ground corn in the ratio of 1 to 1—ground barley and corn in the ratio of 1 to 1—and tankage and ground corn in the ratio of 1 to 7.5. Tables are given in the *Institute Bulletin* showing the coefficients of digestibility of the different rations, and the

influence of one feed upon the digestibility of the nutrients of another feed.

The authors conclude that: (1) the coefficients of digestibility of the nutrients of feeds calculated indirectly by subtracting the weights of the digestible nutrients of one feed as directly determined in other tests from the corresponding values for the two feeds combined, may be, and probably often are, decidedly inaccurate and, (2) the weights of the digestible nutrients of a mixed ration, calculated by the use of the coefficients of digestibility of the nutrients obtained directly for the individual feeds when fed alone, may be decidedly inaccurate.

It therefore follows that in order to obtain strictly accurate results for the coefficients of digestibility, of mixed rations, digestion experiments should be made directly upon the mixed rations as fed.

Other tables show the degree to which each pig digests its food. The authors conclude that under conditions that are practically identical throughout the same experiment, the coefficients of digestibility of the nutrients of a number of different rations show significantly higher values for some pigs than for others. However, the differences in the coefficients of digestibility of the nutrients of the same feeds by the different pigs are probably too small to be considered of much, if any, practical or economic importance.

230—Proportions of Supplements to Corn for Fattening Swine in Ohio.—ROBINSON, W. L., in *Ohio Agricultural Experiment Station, Bulletin* 316, 57 pages. Wooster, Ohio, 1917.

The objects of the experiments described in the bulletin were to determine the relative efficiency of various proportions of corn and the more common supplements, and to compare different methods of proportioning these supplements. The supplements experimented on were tankage, soybeans, linseed oilmeal, and skim milk.

The author concludes that further experiments are needed to determine the method by which a given amount of tankage should be proportioned. The results of the experiments reported were that, when the ration contained as much as 10 per cent of tankage, there was no marked advantage in feeding a larger proportion of tankage in the early than in the later part of the test, and that, when as low as 5 per cent of the ration consisted of tankage, it was advisable to feed a larger proportion during the earlier part of the experiment.

As a supplement to corn, skim milk has a distinct advantage over tankage, particularly for young pigs. There is no one feed that is always best to use as a supplement to corn, nor is there a definite proportion in which a given supplement should always be fed. The age of the pig and the market prices of fat hogs, corn and supplements all need to be taken into account in determining

what supplement to use and the proportion in which to use it.

233—The Rouen Duck: Its Qualities as a Factor in Improvement Crosses.—FAUCILLON, X., in *L'Acclimatation, Journal des Eleveurs*, p. 388-390. Paris, Dec. 8, 1918.

The Rouen duck is a useful breed, productive, easily raised, and everywhere favourably regarded. It has a striking resemblance to its wild ancestor, although it is considerably larger and heavier. The weight of a Rouen drake, improved by selection, is as much as 10 pounds while that of the wild drake is seldom more than 3½ pounds; in the case of females the difference is still more striking. The raising of Rouen ducks has long constituted a very successful branch of the poultry industry, the principal markets being Duclair, Gournayet and Dieppe.

The Duclair duck is a local variety of the Rouen breed. It is large with a wing-spread of 40 inches, dark plumage and flesh, matures early, and is prolific. Its excellent flesh has a more pronounced flavour than that of the ordinary Rouen duck.

The Rouen duck exercises a very favourable influence on other races from the point of view of increased productivity. Its qualities, as an improving factor in cross-breeding, have been extensively made use of in other regions. For instance, crossing between the Barberry drake and Rouen duck produces a duck called "mullard", a large unfertile halfbreed, of delicate flesh and a large liver, valuable as a delicacy. Cross-breeding of the Rouen with other ducks, such as the Pekin and Aylesbury, also gives excellent results.

The author recommends a large increase in the production of the Rouen duck as a valuable help in these times of food shortage.

236—The Sheep Killing Dog in the United States.—WILSON, J. F., in *Farmers' Bulletin No. 935*. U. S. Department of Agriculture. Washington, 1918.

It has been estimated that a total of 108,000 sheep are killed by dogs every year in the farming districts of the United States. These figures are based only upon the number actually paid for, and it is more than probable that the true losses far exceed this.

In 1913 crop reporters in 36 farm states submitted estimates which showed that the number of sheep in those states could be increased 150 per cent without displacing the live stock. The reports submitted also show that sheep raising is very remunerative, but that dogs constitute the most serious obstacle to its development. As remedies for this state of affairs the author suggests a higher tax in dogs in order to reduce their number, and the enactment of much stricter laws. An outline for a suggested State dog law is given covering taxation, identification of licensed dogs, impounding, destruc-

tion of dogs found at large without license tags, killing of sheep killing dogs, and State compensation for owners having sheep killed by dogs.

The bulletin gives specifications for a dog-proof fence designed and tried by the U. S. Forest Service.

In an appendix the author gives a digest of existing State dog laws, with complete texts of the laws of Pennsylvania and West Virginia as examples of modern laws which really offer protection to sheep raisers.

FARM ENGINEERING

246—Carriage of Agricultural Products by Motor Trucks in the United States.—ANDREWS F., in *Farm Implement News* p. 18-19, Chicago, Oct. 31, 1918.

In the United States, when the roads permit it, in the carriage of agricultural products motor trucks are rapidly taking the place of horses. One of the features of this development is the organization of regular motor truck transport services, by means of which farmers may send their products to distant markets without the necessity of waggon, railroad or boat.

The cost of carriage of agricultural products by waggon in 1918 was per short ton per mile about 30 cents for wheat, 33 cents for corn, and 48 cents for cotton. The transport per motor truck per ton-mile was 15 cents for wheat and corn and 18 cents for cotton. These figures are from reports on the transport of agricultural products made by correspondents of the Bureau of Crop Estimates, based on the cost of hiring horses and waggons and motor trucks in different counties.

In 1916 the cost of the carriage by waggons of wheat and cotton to farmers was less than in 1918: 19 cents for wheat and 27 for cotton per ton-mile.

In 1918 the distances products were carried by motor truck averaged 11.3 miles, and by waggons 9 miles; the motor trucks made 3 or 4 return trips per day while the waggons made 1 or 2.

The motor trucks used by farmers are not very large, generally carrying 1 to 2 short tons. In many counties ordinary automobiles were fitted up as trucks for carrying produce; sometimes light waggons were attached to automobiles. In North Dakota and in California tractors are used to haul several waggons at once.

A table gives in detail the cost of carriage of wheat, corn and cotton, the cost per mile, the number of return trips per vehicle, and the distances covered by motor trucks and by waggons in different parts of the United States. In certain parts motor trucks are used for the transport of perishable products. In several States pigs are transported in motor trucks rather than in waggons on account of the smaller diminution in weight of the animals.

The progress of transport by motor truck is greatly influenced by the improvement of roads. Even yet, however, some farmers prefer, after harvest, to use their horses for transporting products and find them more economical than motor trucks.

AGRICULTURAL INDUSTRIES.

252—The Evaporation of Prunes in Oregon.—LEWIS, C. I., BROWN, F. K., and BARSS, A. F., in *Oregon Agricultural College Experiment Station*, Bulletin No. 145, Oregon, July, 1917.

During the summer of 1911 the Division of Horticulture of the Oregon Experiment Station conducted a prune survey of the State. This survey which covered 9 counties and involved a study of 700 prune orchards, revealed the fact that there was a great variation in the methods and types of buildings used in the evaporation of prunes. Immediately after the survey was made the Experiment Station began studies of evaporation in order to obtain a standardization of products. The Bulletin analyzed was prepared for the benefit of prune growers and more especially for those engaged in prune evaporation for the first time. Producers should study carefully the cost of production and evaporation, and aim to obtain products of the first quality.

The Institute Bulletin, in its summary gives details of methods of drying prunes.

254—Production and Supply of Milk and Its Derivatives in Italy.—BRENTANA, D., in *II Moderno Zootatro*, Bologna, 31st Oct., 1918.

The production of milk in Italy had been continually increasing before the war, rising from 440,000,000 gallons in 1894 to 770,000,000 in 1910. The production in 1910 in other European countries was: Germany 5,500,000,000 gallons—France 1,858,000,000—Austria-Hungary 1,122,000,000—England 594,000,000—Holland 578,600,000—Sweden 550,000,000—Denmark 492,800,000—Belgium 352,000,000—Switzerland 330,000,000. In 1914 the production of milk in Italy amounted to 836,000,000 gallons, about one half of which was consumed as milk, the other half being transformed into butter and cheese. About 70,000,000 lbs. of cheese and 6,000,000 lbs. of butter were exported. In 1915 exportation was prohibited in order to assure the supplies for the army.

The author states that the present production of milk in Italy is only half what it was before the war. The price has risen from 13 to 18 cents a gallon in 1916 to 27 cents in 1917 and 40 cents in 1918. In the cities the price was from 50 to 73 cents a gallon.

In October 1918 a Congress, organized by the National Union of Co-operative Dairies was held at Milan in order to devise means of rapidly increasing the dairy production of Italy. The following resolutions were adopted: (1) to take measures for the resto-

ration of the dairies in Venetia and Frioul, and of agriculture in the mountain regions: (2) to encourage the domestic manufacture of machinery used in cheesemaking, and new forms of industrial organization: (3) to undertake the reorganization of institutes for scientific research and instruction in cheesemaking; (4) to resume foreign commerce, and to take into consideration the cheesemaking industry in the revival of the customs tariff; (5) to establish a permanent commission for the protection of the dairy industry.

256—Should the Production of Veal be Encouraged or That of Milk?—GOUIN, A., and ANDOUARD, L., in *Comptes rendus des Séances de l'Académie d'Agriculture de France*, Vol. IV, No. 9, p. 332-336, Paris, 1918.

The authors are of the opinion that during the present food shortage it is in the general interest that less veal be produced and that the milk used in producing veal be used as human food. A pound of veal contains about 190 grains of nutritive principles while there are about 77 grains in a pound of milk of average richness.

In the article in the Institute Bulletin is a table giving the amount of milk consumed and grain in weight of a calf during 10 day periods up to the age of 60 days. It is shown that at first the calf consumes milk 3 times the nutritive value of the veal produced, and later from the 40th to the 60th day of 6 times the value.

If the calf is kept until it reaches 220 lbs., the 132 lbs. gained since birth represent a nutritive value of 55 lbs., and it has consumed 154 gallons of milk of a nutritive value of 262 lbs., that is it has consumed 5 times as much as it has produced.

The authors state that the veal from very young calves is not unsuitable for human consumption.

258—Experiments on the Improvement of Methods of Salting Fish in the United States.—*Commerce Reports*, No. 267, p. 597 Washington, Nov. 23, 1918.

Dr. Donald K. Tressler of the U.S. Bureau of Fisheries has observed experimentally that impurities in salt, even in small quantities, clearly influence the process of salting and the quality of the salted product. Pure sodium chloride penetrates much more deeply and completely into the fish. Penetration is retarded by the addition of a small quantity of calcium chloride to the brine of pure salt; it is retarded still more by magnesium chloride and most by sodium sulphate. These salts of calcium and magnesium being common impurities of salt it is easy to see how they may have an injurious influence on the conservation of fish in warm weather by prolonging the time necessary for the brine to soak into the fish.

The impurities also perceptibly affect the quality of the product. Pure salt produces a tender fish with flesh of a brownish or grey-

ish colour; small quantities of impurities produce a much tougher fish; this is most noticeable with magnesium chloride, which gives a shiny skin. Small quantities of calcium chloride toughen the fish, larger quantities detach the skin from the fish and

make it sticky. Calcium chloride and still more magnesium chloride whiten the flesh.

The effects of these impurities being now known it is possible, not only to salt fish more rapidly and completely, but to obtain a salted fish of the degree of firmness desired.

AGRICULTURAL ECONOMICS

AGRICULTURAL CO-OPERATION IN SIBERIA

(SUMMARY OF AN ARTICLE BY PROF. V. TOTOMIANZ.)

The Dairy Societies and other forms of Co-operation.—Up to some twenty years ago practically the sole object of stockfarming in Siberia was to procure a quantity of butcher's meat sufficient to supply local needs. In 1893 a number of enterprising foreigners established themselves in the country and sold animals and implements to the peasants on credit. This initiative resulted in a general and rapid development of the dairy industry throughout Western Siberia.

In 1901 the first dairy societies on a co-operative basis of the Danish type were established and within 3 years 200 of these *artels* had arisen in Western Siberia and producers were freed from the exploitation of foreign business men.

In 1908 the Union of Siberian Dairy Societies was formed. Its activity extends over a territory of almost half a million square miles. The dairy societies belonging to it are governed by the following rules: (1) mutual liability for all obligations assumed; (2) common management of current business; (3) each member pays an admission fee proportionate to the number of cows he owns; (4) a fine of 5 roubles (\$2.50) per milch cow if the milk is sold elsewhere; (5) fine for adulteration of butter; (6) withdrawal from the society can be allowed only as following on a change of place of residence—a member withdrawing for other reasons has no right to ask for any part of the capital and has no dispensation from his share of the collective liability for the debts contracted by the society up to the day of his withdrawal; (7) the dairy may fulfill other functions, for instance, open co-operative stores where members are obliged to make their purchases.

The Union of Siberian Dairy Societies is governed by rules to which members subscribe on admission. Each dairy pays an admission fee of \$5 and acquires one or more shares of \$50 each. All the butter the dairies make must be consigned to the union from which they must acquire the materials and goods necessary to their buttermaking. The affairs of the Union are arranged by a committee of three members and by the general meeting of the delegates of the dairy societies.

Up to 1908 the export of dairy products was almost a monopoly of foreign merchants

who founded exporting houses in Siberia to trade with Denmark, Great Britain and Germany. The Union in order to eliminate these middlemen entered into relations with British firms which agreed to take Siberian butter, making payments based on prices in local markets. In 1912 the Union founded in London a stock company called the Union of Siberian Co-operative Associations and having a share capital of 1,000,000 roubles (\$510,000). The London Union receives the butter of the Siberian dairies on commission and at once sends 90 per cent of the price obtaining on the foreign market to the Union in Siberia. The remainder is paid when the sale has taken place, interest on the share capital being first deducted at the rate of 6 per cent. A percentage of 2.5 goes to pay the expenses of the Union's foreign agencies, and about 3 cents a pound is allowed to cover the expenses of transport, consignment and insurance.

In December 1917 the Siberian dairies had 120,000 members owning 300,000 milch cows. In that year the export of butter from Siberia was 175,320,000 lbs.

At the end of March 1918 the Union of Siberian Dairy Societies celebrated the tenth anniversary of its foundation. In 1908 it had united only 12 dairies and its sales amounted to about \$1,500,000. In 1918 it comprised 2,500 dairies and its sales during the year amounted to \$80,000,000.

At first the co-operative movement encountered enormous difficulties. Later the peasants became aware of the great advantages which the new movement was procuring for them, especially in the elimination of the middlemen. In 1917, 95 per cent of all the butter produced in Siberia emanated from the dairy societies.

The peasants of Siberia are now in direct connection with the great markets in Russia and abroad. A like progress has been realized by the Union in the field of distribution. It now possesses vast stores which supply the rural population. It has also acquired a large amount of modern machinery for the production of butter. The co-operative movement has also had a beneficial influence in the field of education.

As for the Government, it was obliged increasingly to recognize the importance of the dairies. In war time it accepted the Union's

help in the provisioning of the army. From the time of the outbreak of war until September 1917 the Union supplied to the army foodstuffs of the total value of about \$100,000,000.

Lately various Siberian co-operative societies have taken the initiative in constructing elevators for storing the harvest of grain. Efforts are being made to extend co-operative production to cheesemaking, to organize the export of eggs, etc.

The Purchases and Sales Union of Siberian Co-operative Societies.—The Purchases and Sales Union, established on May 1, 1916, aims at uniting and co-ordinating the co-operative societies scattered over the whole country from the Ural Mountains to the Pacific. It constitutes the centre of the co-operative federations, each of which represents a group of local co-operative societies which retain complete autonomy as regards internal administration. The Purchases and Sales Union is therefore like an association of individual federations conforming to the resolutions of their respective meetings. The central union is liable for losses to the whole extent of its property, while the supplementary liability of each affiliated co-operative association extends to ten times the value of the shares it possesses.

The activity of the Purchases and Sales Union extends into various fields of trade, education and organization. Although a private institution, it works in such a manner that it has a notable influence on the economic policy of the organs of the State. A precise idea of the work and duties of the Purchases and Sales Union can be obtained by considering its offices in the town of Novonikolaievsk. They are the following:—

(1) *The Trade Office* which classifies the orders of affiliated co-operative associations, fulfils them, places them in relation with the contracting firms, buys necessary goods, and supervises the business of all the union's agencies.

(2) *The Revising Office* which provides for the auditing of the central office's books, the instruction in bookkeeping of the auditing offices of the single associations, the study of affiliated associations' systems of bookkeeping and commercial management, the summoning of meetings of the auditors of the trade books of the associations, and the auditing of the books of all the offices of the Purchases and Sales Union.

(3) *The Finance Committee* which studies questions of a financial character regarding the Purchases and Sales Union, supervises its financial position and co-ordinates the activity of the central management with that of the affiliated federations.

(4) *The Dairies Office* gives instructions to the affiliated dairies, co-ordinates the systems of manufacturing and consigning butter, acquires all necessary articles, studies means of improving production, institutes and

supervises special schools, as for example the Higher Dairy School, and markets both at home and abroad the butter produced.

(5) *The Fisheries Office* organizes the river and sea fishing of Siberia, seeks to improve fishing methods, distributes fish in the various regions of Siberia and in European Russia, acquires fishermen's requisites, organizes co-operative societies among populations living by fishing and other fishermen's mutual aid associations.

(6) *The Raw Materials Office* instructs the affiliated co-operative federations, and supervises the buying and marketing of raw material on home and foreign markets.

(7) *The Industries Office* prepares and works out schemes for the industrial programmes of the co-operative federations instructing them in all matters regarding industrial enterprise, co-ordinating their activity and supervising their various industrial establishments.

(8) The Information Office collects and classifies information as to all the Purchases and Sales Union's fields of activity, basing itself on the reports received from the commercial agents, the local offices, the secretaries of the co-operative associations concerned and finally the general press. It distributes the material thus collected among the single co-operative societies with the object of co-ordinating their commercial activity.

(9) *The Transport Office* which has the duty of studying methods of facilitating the strictest relations with the local authorities, preparing a programme for the transport and consignment of merchandise on a large scale, and drawing up time tables for the railways and tariffs for the roads of communication belonging to the State and the communes.

(10) *The Secretarial Office* which instructs the co-operative unions as to their programmes of internal organization, provides them with books and other means of instruction, opens schools and co-operative societies, holds courses of lectures, publishes a monthly co-operative review for Siberia, maintains a co-operative library, disseminates pamphlets and leaflets on propaganda, organizes statistical enquiries, co-ordinating the statistical material supplied by the various co-operative societies, gives advice in legal cases by means of consulting lawyers, helping co-operative societies in all their legal business, makes enquiries into the laws governing co-operation, takes part in meetings treating of these subjects, and keeps the agricultural class informed as to all questions which can interest it in its relations with authorities.

(11) *The Foreign Office* which supervises the agencies instituted abroad, collects and classifies information and data as to the world's markets, acquires and distributes foreign securities to provide for the most urgent payments, drafts bills for the regulation of the commercial exchange between

Siberia and foreign countries, takes part in meetings and conferences concerned with the supervision of importation and exportation.

(12) *The Economic Council* which makes enquiries as to all economic problems relative to co-operation, prepares bills on this subject, takes part in conferences on economic problems, and regulates the economic policy of the affiliated co-operative federations.

The vast activity of the Purchases and Sales Union is distributed among these twelve offices, on the principles of specialization and of the strict selection of the technical and consulting staff. The Economic Council is composed not only of such consulting experts as professors of political economy and kindred subjects, but also of representatives of the various offices, and thus it is an auxiliary organization which helps the central management in all its far-reaching work. Each office is managed by a member of the central board of management. In the same way the managers of the most important agencies of the Purchases and Sales Union, as for example the Moscow agency and the agencies founded abroad, belong to the central board of management. The latter is appointed by the delegates of the individual co-operative federations at their annual meetings, and constitutes the central managing body of the Purchases and Sales Unions.

The co-operative federations belonging to the Purchase and Sales Union act as its local agencies. Hitherto such agencies, beginning with the chief among them which is at Moscow and which acts as a central agency for European Russia, having a staff of commercial travellers who visit all the markets of Russia, have been instituted in the following towns: in European Russia at Nijni-Novgorod, Ekaterinburg, Kungur and Sarapul in Siberia at Irkutsk, Blagoviesh-

tchensk, Charbin, Vladivostock, Nicolaitevsk, and abroad at London, New York and Copenhagen, the London agency being the principal foreign agency.

The Purchases and Sales Union has initiated a new era in the history of the co-operative movement in Siberia. The period which preceded its organization was characterized by an almost absolute lack of co-ordination among the different co-operative societies, in consequence of which the financial position of the whole co-operative movement suffered much. Moreover, the ignorance on the part of Siberian co-operative societies of modern methods of marketing agricultural produce greatly weakened the movement in its competition with private enterprise. The co-operative federations affiliated to the Purchases and Sales Union find themselves today in a position to exercise a growing influence on the State authorities, independently of the form of the government which has changed several times in recent years. In the sphere of trade the Purchases and Sales Union introduced discipline and order into the business of acquiring and marketing produce as profitably as possible.

The business of the Purchases and Sales Union has reached an unhopd-for figure. It is enough to state that this union acquired about 1,700 tons of tea, and, among other articles, large quantities of wicks and lucifer matches.

The vicissitudes through which Russia has lately passed have had their sad reaction in Siberia and have impeded the development of the Purchases and Sales Union, but there is question only of a period of temporary arrest whence the co-operative movement will issue stronger and more fully alive than before.

WOMEN IN AGRICULTURE IN GREAT BRITAIN

Women in Agriculture before the War.—Until the seventies of the nineteenth century peasant women still habitually worked on the land throughout England and Wales. Since 1840, however, disinterested public sentiment was against such employment. By 1911 the custom was dying out, although in some districts, particularly in the north, the wives and daughters of owners and tenants frequently assisted in the fields. In the fruit and flower growing districts and also in the hop districts they were often employed at certain seasons. In Scotland women were still largely employed in agriculture up to the very eve of the war.

In the years immediately preceding the war a certain number of women received training in horticulture or agriculture in agricultural schools and colleges. Some of them became small holders, utilizing their land as market or nursery gardens or as

poultry farms or small mixed farms. Others became wage earners as gardeners, managers of commercial dairies and cheese factories, assistants to poultry farmers, etc. On the whole, the salaries earned by educated women in agriculture and the amount of leisure they enjoyed compared unfavourably with those obtained in other professions.

Women in Agriculture during the War.—Early in the war it became evident that it would be necessary to use women to fill the places of men taken from agriculture for the army. It has been seen, however, that in England and Wales at any rate, the number of women who had any agricultural skill was very inadequate to the need. The problem which arose was twofold: it was necessary both to find women willing to do the work and to train them.

In 1915 the Board of Agriculture and Fisheries entered into an arrangement with

various agricultural colleges and farm institutes for training women for whom the Board provided scholarships. It was soon evident, however, that the women already living in country districts were not enough to meet the need for workers and it was necessary to draw on other classes. Town dwellers were recruited. It was found, in particular, that the enterprise and energy, and in many cases the exemption from immediate necessity to earn a livelihood of girls of the upper and middle classes, made them available as material for forming the new women labourers. Training centres for city women were organized, and the experiment was so successful that it led to the formation in 1916 of the Women's National Land Service Corps. Training for the corps lasted six weeks and aimed definitely at producing cow-women and horse-women. Most of them paid for their own maintenance during training.

In 1917 the Women's Land Army was formed. Three methods of training were followed: (1) A farmer was allowed to have for three weeks the services of a recruit to whom he paid no wages and for whose maintenance the Land Army paid. He trained her for the work for which he required her, and paid her wages after the expiry of the three weeks: (2) A farmer undertook to train one or more women for a period of from four to six weeks. The Land Army paid for their maintenance and they gave their labour in return for their training. When trained they were transferred to paid employment under other farmers: (3) Recruits were housed in a hostel supervised by an instructress and a housekeeper. It was usually situated on a farm which gave adequate facilities for training recruits or in the centre of a district in which there were several farms where such training would be received. This method of training was perhaps the most successful.

The extent to which women have increased the supply of agricultural labour in Great Britain may be estimated from the fact that between March, 1917, and October, 1918, the Women's Land Army alone supplied some 16,000 women for field and other farm work, exclusively of those who went directly to work for the Timber Supply and Forage Departments.

It is estimated that of the women who have gone into agriculture only 16 per cent have failed for reasons of health to do useful work. Women have naturally been more successful in some branches of work than in others. They have distinguished themselves particularly in dairy work, in the care of young stock, in certain kinds of field work and in the lighter works of forestry. In threshing, thatching and driving motor tractors they have also met with remarkable success. It has been found that heavy, monotonous labour tends to weary them physically and mentally and sometimes produces in them a reaction dangerous to discipline. On the members of the army themselves, and in particular on those of them who have come from large towns, in some cases the slums of towns, the work has had an excellent effect as regards their health, their nerves, their powers of initiative and their zest for life.

The Future of Women in Agriculture.—In considering the question of whether women workers will remain in agriculture after the war the fact must be first acknowledged that many of them wish to do so. They have acquired a taste for the work and discovered the benefit they derive from it.

The question that remains is whether they will still find employment after the emergency created by the war has ceased to exist. Farmers have many of them been converted to a favourable view of their activities; but whether or not their superior adaptability and quickness will ever or often cause them to succeed in competition against men for places as wage-earning labourers remains problematical, as do also the degree of severity which the conditions of the labour market will give to such competition, and the extent to which women will embark on it.

In considering women who belong to the agricultural class, the wives and daughters of farmers, ploughmen and the agricultural labourers, the outlook is less speculative. The prejudice many of these women previously entertained in common with their menfolk, against the work of women on the land has been largely overcome by the example of the Land Army. It is probable that they will henceforth participate to a larger extent and with more goodwill than before in the labours of agriculture.

JEWISH AGRICULTURAL COLONIZATION IN PALESTINE

The author of the article in the Institute Economic Bulletin first gives a detailed account of the natural and economic conditions of Palestine. The vegetation is like that of Italy and Greece, and grapes, olives, oranges, almonds, figs, etc., are grown by means of irrigation. The soil is suitable for the cultivation of corn, barley, sesamun, etc. The forests once so plentiful exist no longer.

Sheep and goats are the most important domestic animals. The chief articles of export are oranges, soap and wine.

The population of Palestine is about 700,000 or 10 to 15 per cent of that found in the time of the country's prosperity, and it could still maintain its former population if it recovered scientifically economic conditions. About three-fourths of the inhabi-

tants are Arabs, and there are 12,000 Jews and 100,000 Christians. The percentage of the total population formed by Jews is larger than it is in any other country.

Means of communication leave much to be desired. The old Roman roads have been largely destroyed. Several railroads in course of construction are expected to open up the country to foreign capital to a greater degree than heretofore.

The author describes certain peculiarities of the agrarian system in Palestine. Under Turkish rule the system of land tenure is not favourable to the cultivation of land by private persons. Agriculture still follows primitive methods.

The history of Jewish Colonization in Palestine is then fully dealt with by the author, especially the colonization schemes of Baron Rothschild.

Side by side with the colonization which had a strictly economic and philanthropic character, a new current of ideas, having a national and political character, developed towards the end of last century and was known as Zionism. The ideal of this movement is the foundation in Palestine of a national home for Jews guaranteed by public law, in accordance with the programme adopted by the first Zionist congress at Basle in 1897. In the economic sphere Zionism aims at buying land in Palestine in order to found there colonies which can be the inalienable possession of the Jewish people. The colonist receives only the usufruct. The legal title by which such land is held is that of emphyteusis or hereditary lease. Land thus acquired is exempted forever from private speculation, and land revenue belongs to the State. By this ideal Zionism is connected with the ancient Hebrew agrarian system while at the same time it keeps pace with the movement of modern agrarian reform.

The means at the disposal of Zionism for the fulfilment of its task are the following:

In 1899, that is to say in the year in which Baron de Rothschild's colonies passed to the *Ica's* management, the Zionist colonial organization founded a Jewish colonial bank, the Jewish Colonial Trust, a limited liability company which has its offices in London. It is the function of this bank to facilitate the purchase of lands in Palestine and to grant to colonists short-term loans and long-term mortgage credit, hitherto entirely lacking in Palestine. In 1900 this bank opened two branches, one at Jaffa, the Anglo-Palestine Company, which had local offices at Jerusalem, Beyrouth, Caiffa, Safed, Hebron, Tiberias and Gaza, and the other, known as the Anglo-Levantine Banking Company, at Constantinople.

Another Zionist institution, the Jewish National Fund, founded in 1901, also became an important colonizing factor. It was organized as a limited liability company having offices in London. Its income consists ex-

clusively of gifts and subscriptions, especially from the least well-to-do classes. The capital thus obtained amounted to \$1,500,000 at the end of 1917. This institution enjoys a great popularity among Jews adhering to Zionism. It is very active both in the social and economic and in the industrial spheres. In 1908 it founded a model agricultural school in the colony of *Kinereth* and an olive-grove in the colony of *Hulda* in Judaea near the Jaffa-Jerusalem railway. In the same year the colony of *Daganya* on Lake Tiberias was founded. In 1910 the colony of *Ben Scemen* near Hulda was founded to intensify the cultivation of olives.

In 1908 another important institution was founded with the help of the National Fund, the Palestine Land Development Company. The object of this company is to manage the lands of the National Fund, especially those lying on lake Tiberias, the value of which can be realized only by means of large capital and therefore not by the Jewish farmers. The Land Development Company also grants to individuals lots of cultivable land which it continues to manage if the owners live outside Palestine. In 1912 it amalgamated with the *Ica* in order to pursue with that body the work of colonization in Palestine. In this way the purchase was effected of the *Disceia* estate at the extreme south of Palestine, near Gaza, of *Cafruria* in Judaea, and of *Karkur* which lies near the coast, halfway between Jaffa and Caiffa. This institution also bought other lands which it is now preparing for colonization.

In 1911 the National Fund was responsible for founding an institution which aims at forming co-operative agricultural colonies. It is called the Erez Israel Settlement Association, and it has formed two co-operative colonies of this kind, namely the *Marchavia* and the *Dagaria*, on the principles of Professor Oppenheimer.

An account of the work of the colonization companies is given in the article in the Institute Bulletin. A table is included giving the name, year of foundation, approximate population, area and purpose of each colony. Details of the loans made to colonists by the Anglo-Palestine Company Bank are given. Co-operative credit societies have been established.

Urban colonization is also much encouraged by the Jews in Palestine, with a view to attracting the most well-to-do classes, who establish themselves in towns, and to providing an easy market for the produce of neighbouring Jewish colonies. Such colonization has been very active in the neighbourhood of Jaffa, where a sort of suburb, *Tal Aviv* or Spring Hill, has been established. With its wide and clean streets and its dwellings supplied with all the apparatus of modern comfort, it resembles a modern European garden-city. The National Fund has through the medium of the Anglo-Palestine Company contributed \$50,000 to the making of this little Jewish town.

CREDIT FOR THE ACQUISITION OF SMALL RURAL HOLDINGS IN FRANCE

The French law of April 9, 1918, aims at an exceptional and privileged distribution of small holdings for the benefit of military pensioners and of civilians who have suffered from the war. It authorizes societies affording credit on real estate and agricultural security to grant the beneficiaries mortgage loans to facilitate the acquisition and reconstitution of small holdings of a value not exceeding \$2,000. These loans are granted at a reduced rate of interest with the help

of funds which the State advances to the societies without interest.

The article (9 pages) in the Institute Economic Bulletin gives details of the law, covering the objects of the loans, their amount and duration, the rate of interest and methods of repayment, security, conditions to be fulfilled by the applicant, terms on which the State makes advances to the district banks, etc.

CONTENTS OF THE INSTITUTE ECONOMIC BULLETIN

In addition to those already dealt with herein, the following is a list of the more important subjects treated in the March and April numbers of the International Review of Agricultural Economics. Persons interested in any of the articles in this list may obtain the original bulletins on application to the Institute Branch, so long as the supply for distribution is not exhausted.

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AGRICULTURAL STATISTICS

WORLD'S WHEAT CROP SITUATION IN 1919-20 COMPARED
WITH PRE-WAR CONDITIONS

BY T. K. DOHERTY, LL. B.

1 *Distribution of Pre-War Wheat Crop.*

The conditions under which distribution takes place have been entirely changed in consequence of the war. Russia, which exported 164,000,000 bushels of wheat in 1913-14, this year, it is creditably reported can no more than satisfy her own needs. Her rich wheat lands continue to be overrun by warring armies, the transportation systems have to a great extent broken down, so that in a great number of cases surplus areas cannot supply grain to deficient areas. It is not at all improbable that on that account before the present year ends some millions of bushels of wheat may have to be brought through the Murman Coast and Archangel to succour the starving hordes of Petrograd, if not even of Moscow. Then even when a single constitutional Government is in control, its jurisdiction will probably no longer extend to certain provinces along the Baltic nor to Poland, nor to the rich wheat-producing soils of the Ukraine. The Ukraine (as part of Russia), Roumania and Bulgaria were considerable exporters in 1913-14, but can during the present year no more than satisfy their own needs. Austria-Hungary in the year before the war was self-sufficient, now a considerable proportion of the wheat-producing area has suffered from the upheaval of the

Bolsheviki movement, and the remainder is parcelled up between Poland, Czecho-Slovakia and Italy, while insistent appeals for food are coming from all sides.

On the other hand, certain of the pre-war importing states, besides suffering on account of the war from reduced production, have extended their territory and their jurisdiction over areas which are inconsiderable producers of wheat, and these importing states will in consequence have to very materially increase their imports. These are chiefly France and Italy, but the observation also applies in so far as Mesopotamia, Palestine and Constantinople are concerned.

Russia, Roumania and Bulgaria, which in 1913 furnished 228,000,000 bushels of the world's requirements, are therefore out of the running, and India, which in that year exported 50,000,000 bushels has now, in consequence of the 100,000,000 deficiency in its last crop, become an importer.

In view of this change of orientation in the movement of the import and export resulting from the war, before entering upon a presentation of the data relating to the distribution of this year's wheat crop, it will be expedient to examine in the two following tables the imports and exports by countries on an average of the five years ending July, 1914.

IMPORTING COUNTRIES

Country	Home production Average of five years ending February, 1914.	Net import of wheat and flour Average of five years ending July, 1914.	Total average requirements before the war.
Great Britain.....	59,525,000	216,053,000	275,578,000
Germany.....	152,859,000	68,343,000	221,197,000
Italy.....	183,351,000	53,278,000	236,629,000
Belgium.....	15,065,000	49,237,000	64,301,000
France.....	317,466,000	43,725,000	361,191,000
Holland.....	4,777,000	22,046,000	26,823,000
Switzerland.....	3,307,000	16,902,000	20,209,000
Austria-Hungary.....	230,750,000	10,288,000	241,039,000
Egypt.....	34,907,000	7,716,000	42,623,000
Sweden.....	8,084,000	6,981,000	15,065,000
Denmark.....	5,512,000	6,240,000	11,758,000
Spain.....	130,440,000	6,246,000	136,686,000
Japan.....	24,251,000	4,042,000	28,293,000
Norway.....	367,000	3,674,000	4,041,000
Tunis.....	6,246,000	735,000	6,981,000
Totals.....	1,176,907,000	515,512,000	1,692,414,000

EXPORTING COUNTRIES

Country.	Average exports of five years ending July, 1914.	Year ending July, 1915.	Year ending July, 1918.
Russia.....	164,244,000	4,409,000	13,595,000
United States.....	106,924,000	310,852,000	232,588,000
Canada.....	94,799,000	85,980,000	267,494,000
Argentina.....	83,040,000	91,859,000	62,464,000
Roumania.....	53,646,000	3,674,000	22,414,000
India.....	49,604,000	37,111,000	6,981,000
Algeria.....	5,144,000	(3,674,000)	5,144,000
Australia.....	53,278,000	4,042,000	36,744,000
Total of States which have furnished statistics.....	610,679,000	541,601,000	647,424,000
Other countries (a).....	13,228,000	9,553,000	13,963,000
Grand total.....	623,907,000	551,154,000	661,387,000

(a) Bulgaria, Chile, Uruguay and New Zealand.

It will be observed that in the pre-war period the exports amounted to 624,000,000 bushels, while the imports were for Europe alone (excluding Japan from the above table) 515,000,000 bushels, and do not comprise the 98,000,000 bushels which were known to have been imported by countries outside of Europe, which do not furnish regular statistics. The imports into all countries aggregated 613,000,000 bushels, while the exports aggregated 624,000,000. There is invariably this discrepancy between the total estimated imports and the recorded exports, the latter being always larger owing to losses in transit in quantity and weight of cargoes and by possible errors in statistics. It will now be expedient to consider the actual

situation beginning with the statement of production.

2. *Distribution of the World's Wheat Crop of 1919-20.*

First will be given in the three following tables the areas in wheat, followed by the world's production and distribution of production by continents. The receipt of statistics of crops by the International Institute has not yet become normal, hence in the three following tables a large proportion of the data, as indicated in the notes, are estimates made in the office of the Canadian Institute Branch on the basis of private reports of condition, acreage and production, and very largely derived from Broomhall's "Corn Trade News."

WORLD'S WHEAT ACREAGE.

Countries.	1919.	1918	Five years' average 1909-13
	Acres.	Acres.	
Belgium.....	277,000	237,000	395,000
Denmark.....	125,000(a)	141,000(a)	114,000
Spain.....	11,317,000(a)	10,230,000(a)	9,548,000
France.....	11,779,000(a)	11,360,000(a)	16,161,000
Great Britain and Ireland.....	3,268,000(a)	2,773,000(a)	1,887,000
Italy.....	10,502,000(a)	10,798,000(a)	11,723,000
Norway.....	41,000	41,000(a)	12,000
Sweden.....	378,000	378,000(a)	235,000
Netherlands.....	143,000	143,000(a)	138,000
Portugal.....	1,210,000	1,210,000	1,210,000
Greece.....	937,000(a)	865,000	865,000
Switzerland.....	202,000	202,000(a)	104,000
Russia-in-Europe.....	35,350,000	35,350,000	58,927,000
Roumania.....	3,200,000	2,750,000	4,576,000
Serbia.....	660,000	560,000	940,000
Bulgaria.....	2,040,000	1,750,000	2,910,000
Germany.....	3,547,000	3,547,000(a)	4,769,000
Austria.....	2,100,000	1,800,000	3,012,000
Hungary.....	6,300,000	5,500,000	9,078,000
Canada.....	17,283,000(a)	17,354,000(a)	9,945,000
United States.....	71,526,000(a)	59,110,000(a)	47,097,000
India.....	23,415,000(a)	35,497,000(a)	29,218,000
Japan.....	1,362,000(a)	1,458,000(a)	1,196,000
Algeria.....	2,000,000	3,186,000(a)	3,494,000
Egypt.....	1,200,000	1,286,000(a)	1,315,000
Tunis.....	1,190,000	1,413,000(a)	1,310,000
South Africa.....	900,000	953,000(a)	744,000
Argentina.....	16,000,000	16,976,000(a)	16,052,000
Australia.....	8,000,000	8,649,000(a)	7,603,000
New Zealand.....	220,000(a)	221,000(a)	242,000
Totals.....	236,472,000	235,738,000	244,820,000

(a) Official figures. The figures for the five years' average are all official.

TABLE IV—WORLD'S PRODUCTION OF WHEAT.

Countries.	1919.	1918	Pre-war five years' average 1909-13.
	Bushels.	Bushels.	Bushels.
United States	1,161,000,000	917,100,000	686,697,000
Canada..	282,105,000	189,075,000	197,118,000
Mexico	8,000,000(a)	8,000,000	8,480,000
Argentina..	160,000,000(a)	184,270,000	147,071,000
Chile	12,000,000(a)	12,000,000	14,000,000
Uruguay...	7,000,000(a)	8,000,000	6,519,000
Austria	40,000,000(b)	40,000,000	60,840,000
Hungary	104,000,000(b)	103,000,000	169,646,000
Belgium..	8,000,000(b)	9,000,000	14,896,000
Bulgaria..	34,000,000(a)	34,000,000	42,440,000
Denmark..	5,200,000(b)	6,320,000	5,344,000
France	180,000,000(a)	233,784,000	317,639,000
Germany...	80,000,000(a)	90,331,000	152,120,000
Greece...	4,000,000(b)	8,000,000	4,320,000
Italy	160,000,000(b)	176,372,000	183,336,000
Herzegovinia and Bosnia..	1,500,000(a)	1,500,000	2,560,000
Netherlands	4,000,000(b)	4,823,000	4,896,000
Norway	800,000(b)	1,087,000	306,000
Luxemburg	500,000(a)	512,000	613,000
Portugal...	6,400,000(b)	7,000,000	7,440,000
Roumania	70,000,000(a)	70,000,000	87,793,000
Russia-in-Europe..	550,000,000(a)	475,000,000	624,620,000
Russian Poland.	15,000,000(a)	12,160,000	21,930,000
Serbia	8,000,000(a)	8,000,000	13,800,000
Spain	138,398,000	135,710,000	130,447,000
Sweden.	8,000,000(b)	9,003,000	7,769,000
Switzerland	6,000,000(b)	7,095,000	3,314,000
Cyprus and Malta	2,400,000(a)	2,400,000	2,400,000
Great Britain and Ireland	75,000,000(a)	93,178,000	59,640,000
India	276,526,000	379,829,000	359,035,000
Japan	25,000,000	25,593,000	24,166,000
Russia-in-Asia	110,000,000(a)	90,000,000	151,142,000
Persia.	13,000,000(a)	13,600,000	13,600,000
Algeria	25,000,000(a)	35,000,000	34,998,000
Egypt.	30,000,000(a)	32,555,000	34,814,000
Union of South Africa.	5,000,000(a)	8,600,000	6,520,000
Tunis	6,614,000	8,451,000	6,230,000
Australia	90,000,000(a)	80,836,000	90,500,000
New Zealand...	6,000,000(a)	6,265,000	7,070,000
Totals	3,718,443,000	3,527,449,000	3,706,069,000

(a) Estimates based on condition reports.

(b) Broomhall's Corn Trade News.

TABLE V—RECAPITULATION BY CONTINENTS.

	1919	1918.	Five years' average
North America	1,451,105,000	1,114,175,000	892,295,000
South America	179,000,000	204,270,000	167,590,000
Europe	1,501,198,000	1,528,275,000	1,918,109,000
Asia	424,526,000	509,022,000	547,943,000
Africa	66,614,000	84,606,000	82,562,000
Australia	96,000,000	87,101,000	97,570,000

North America excelled its pre-war production, therefore, by 559 million bushels; while Europe's total dropped 417 million and Asia's total, owing chiefly to the one hundred million deficiency in India, dropped 123 million bushels. As India's crop failure resulted from an exceptionally severe drought, the future readjustment of supplies rests with Europe and North America.

It appears from the production table that the 1919-20 figures, including the prospective crops of the Southern Hemisphere, are

12,000,000 bushels in excess of the pre-war production and 191,000,000 bushels in excess of the figures for 1918. All the important importing countries, except Great Britain and Spain, produced smaller crops than in the pre-war period, while exporting countries produced much more abundantly, notably the United States. The total world's wheat in 1919-20, viz. 3,718,000,000 bushels, compares with a total for the same countries of 3,969,000,000 bushels in 1913 and of 3,717,000,000 bushels in 1912. It therefore

practically equals the crop of 1912 and is 251,000,000 bushels less than the record crop of 1913. The 1913 crop was 250,000,000 bushels in excess of that of 1912, which was also a record crop up to 1912.

The fact that the crop of 1919 has reached such a high level is the best guarantee that there is an abundance for all requirements. However, it is well to reflect how easily the enormous crop of 1913 was absorbed in 1914, and that there is a tendency already well established in Australia and Argentina to produce less wheat. There is therefore no justification for assuming that the present

crop will be more than sufficient to provide for immediate needs and establish carry-over stocks which have been entirely lacking in the last two years. On examination of the 1919 crop there appears a wide disparity between the deficiency countries and the surplus countries, and the world's shipping will be taxed to its utmost to effect the distribution of the huge surplus crops.

Demand.—The demand situation for the world's grain year beginning August 1st, 1919 and ending July 31, 1920, works out approximately as follows:

TABLE VI.

Countries.	Indicated crop estimated Aug. 1st, 1919.	Normal consumption.	Indicated requirements.
Great Britain and Ireland	75,000,000	276,000,000	200,000,000
France	180,000,000	461,000,000	150,000,000
Italy	160,000,000	237,000,000	95,000,000
Spain	138,000,000	136,700,000	
Portugal	6,000,000		4,000,000
Greece	4,000,000		15,000,000
Holland, Switzerland, Norway, Sweden and Denmark	24,000,000		50,000,000
Belgium	8,000,000	65,000,000	(a) 60,000,000
Egypt, Mesopotamia, Constantinople and Turkey	80,000,000	221,000,000	20,000,000
Germany	144,000,000	241,000,000	130,000,000
Austria-Hungary and Czecho-Slovakia			80,000,000
Total for Europe			804,000,000
Ex-Europe			(b) 60,000,000
World's aggregate requirements			864,000,000

(a) Ample provision has to be made for armies occupying adjacent territory and for Belgium's reconstruction needs. The normal import would be 50,000,000 bushels.

(b) Pre-war imports were 98,000,000 bushels.

In the preceding indicated requirements, India,—which has to this date already imported from Australia five million bushels, and earlier in the year exported about the same amount—does not figure at all. It is hoped she may recoup herself for a hundred million deficiency in the last crop, by a surplus in the crop which is now being seeded under conditions at first favourable,

but latterly uncertain. Neither do the above mentioned indicated requirements take into consideration the probable export to Northern Russia and Petrograd. Neither do they provide for carry-over stocks in the importing countries.

Supply.—Dealing in round approximate figures the supply works out as follows:

TABLE VII.

Countries.	Carry-over at August 1st, 1919 beginning of crop year.	Production 1919.	Home needs and waste.	Probable export.	Carry-over at August 1st, 1920.
	Bushels.	Bushels.	Bushels.	Bushels.	Bushels.
Canada	7,000,000	282,000,000	98,000,000	175,000,000	16,000,000
United States	22,000,000	1,161,000,000	716,000,000	440,000,000	27,000,000
Argentina	156,000,000	160,000,000	78,000,000	150,000,000	88,000,000
Australia	138,000,000	90,000,000	50,000,000	100,000,000	78,000,000
Totals	323,000,000	1,693,000,000	942,000,000	865,000,000	209,000,000

It will have been seen that provision is made for reducing the carry-over stocks in 1920 by 114 million bushels, but still leaving a generous allotment of stock in the far distant supply markets where it cannot be hoped that the available shipping can entirely clean up the long standing old stocks.

In fact the crucial test of the whole situation—the realization of the above-mentioned exports depends upon the shipping facilities, which will have to handle nearly 300 million bushels in excess of the preceding year, besides coping with the enormously increased general trade.

TABLE VIII—MONTHLY EXPORTS OF WHEAT.
(Including Flour for Canada and the United States.)
(Thousands of Bushels.)

Months.	Canada.	United States.	India.	Australia	Argentina	Totals for five countries
1918 19						
August	3,790	19,496	1,172	3,620	19,004	47,082
September	3,541	28,347	900	2,980	6,640	42,409
October	8,324	24,531	1,012	2,772	4,504	41,143
November	7,023	21,989	1,392	3,892	2,672	36,968
December	13,426	33,539		3,216	2,820	53,001
January	10,164	22,103		2,532	3,964	38,763
February	4,149	15,842		6,008	2,064	28,063
March	6,766	20,314		11,324	3,224	41,628
April	6,613	31,127		9,500	5,564	52,804
May	14,577	26,342		12,100	8,116	61,135
June	11,612	35,484		11,176	10,280	68,552
July (estimated)	12,000	40,000		12,000	10,000	74,000
Totals for year 1918-19	101,985	319,114	4,476	81,120	78,852	585,548

NOTES ON FOREIGN CROP PROSPECTS.

(From Broomhall's Corn Trade News).

United Kingdom.—Cable advices are to the effect that wheat is about a fair crop and the forage outlook is distinctly improved since the return of favourable weather.

France.—The recent rains were of great benefit to fodder crops, potatoes, etc., but they came too late to help the main cereal crops, which had already flowered or were maturing when the weather changed. Harvesting is extending to the eastern and western regions; general results are expected to be about 25 to 30 per cent below last year, but it goes without saying that the best yield will be obtained from winter wheat and rye. Monsieur Victor Boret, the Minister of Revictualling, has presented a memorandum to the Council of Ministers on the crop situation of France and the revictualling position. According to the report in Paris papers, the Revictualling Minister considers the situation of the country extremely critical owing to the drought, and he thinks it necessary that imports should be facilitated as much as possible by the abolition of the measures of restrictions which are still in force. Other reports describe the drought as very serious. France has reimposed pre-War import duties on oats, barley and corn.

Germany.—Precipitation was favourable for crops in this country and reports being received speak much more optimistically regarding prospects. Some advices go so far as to state that the crops are the best in

years. An earlier report from the International Institute states that the latter part of the winter was generally very wet and mild, with some snowstorms. During the first half of March the crops derived much benefit from the sunshine, but there was then a sudden change to strong east wind and frost everywhere, followed by snow. Speaking generally, crops had got through the winter very well until this period. Much of the rye, especially the late sown has suffered a little from blight, but no important injury has taken place. Other cereals are hardly up to what was hoped for, and present reports are less favourable than earlier ones. The crop condition in Prussia on 15th April, 1919, was as follows, expressed according to the German system (1 equals very good, 2 equals good, 3 equals average, 4 equals poor;—Wheat, 2 7; Rye, 2 6; Barley, 2 6. Correspondents' replies to the circular of the Bureau of Agriculture for Germany as to crop condition on 15th April, 1919, were as follows: 68 per cent. of the correspondents say "good to very good"; 22 per cent. "average to satisfactory"; 10 per cent. "bad in reference to winter sown." For the spring sowings, 13 per cent. state that nothing has yet been done; 81 per cent. that the sowings are in progress, and 6 per cent. that they are complete. To a question as to any abandonment of area sown, 13 per cent. reply affirmatively, 76 per cent. negatively, and 11 per cent. that facts are yet uncertain. As regards rain, 79 per cent. report a sufficiency, and 21 per cent. an insufficiency.

Italy.—Wheat crop, which is now being harvested, is equal to last year's in the southern regions, but there are continued complaints of a poor crop in the north, where also corn is suffering from lack of rain.

Spain.—Harvest reports and indications continue to be generally favourable.

North Africa.—Reports state that harvest indications are about as recently—that is, the crops are variable, but about fair on the whole. The total out-turn will probably be much less than in 1918, but on the other hand there are fair to good stocks of old crop wheat.

Russia.—Some optimistic reports of the agricultural situation have appeared in the daily press, but while we think these may be true as far as Siberia is concerned, yet we cannot believe that European Russia has good crops this year, or reaped good harvests in 1918 or 1917. We are prepared to believe that the country as a whole possesses suffi-

cient grain for home needs and that certain surplus regions have relatively liberal quantities, but we cannot believe that agriculture can flourish in a land torn with dissensions and more or less overrun with fighting armies.

India.—An official cable reports that the monsoon is still somewhat unsteady, but that crop prospects, especially in the peninsula, have been greatly improved by recent rains.

Australia.—Occasional rains are reported and weather is favourable for new crops. The Oat Standard Committee has fixed the standard for 1919 as follows: Milling Algerian Oats $38\frac{1}{2}$ pounds per bushel; Shipping or No. 1 Feed $36\frac{1}{2}$ pounds, No. 2 Feed $34\frac{1}{2}$ pounds, Clipped and Cleaned Algerian Oats, one grade only 44 pounds. Stocks of wheat are given as 153,000,000 bushels, including wheat needed by home millers.

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DOMINION OF CANADA
DEPARTMENT OF AGRICULTURE

The Agricultural Gazette of Canada

EDITOR: J. B. SPENCER, B.S.A.

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1919



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OF CANADA

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THE RURAL COMMUNITY CENTRE MOVEMENT.

IN an address recently delivered before the Montreal Board of Trade Mr. Christopher Turner of the Royal Colonial Institute pointed out that urban prosperity could not continue at the expense of rural decay, because the prosperity of the two was inter-dependent: agricultural production being necessary to urban prosperity and vice versa, while without a strong rural population the physical forces of the race would inevitably decline. Amongst all the nations Great Britain, he said, was the only one to show an absolute decrease in agricultural population with a disproportionate growth in urban numbers. He regarded rural development throughout the Empire as the real basis of reconstruction. The land and the people were the greatest imperial assets, and unless the two were brought together he did not see how they could, during the next ten years, recuperate and consolidate the Empire.

Mr. Turner was dealing with an empire problem. His remarks were applicable to the situation as we find it within the boundaries of Canada. For many years the rural population has been declining until the running of a farm has become a real hardship because of an insufficient labour supply. Even when prices received for farm products are much higher than at any time during the recollection of the present generation, the urbanward flow of population continues. During a session of the Special Committee of the House of Commons on Agriculture and Colonization held while Parliament was in session, Mr. George H. Clark, the Seed Commissioner, speaking of the situation in Ontario remarked that,

"For twenty years there has been a pronounced movement of the people from the farms of Ontario to the cities. Throughout central and western Ontario there are thousands of farms that might be purchased at actually less than the present cost of constructing the buildings and other improvements on them. From considerable data available we find that prior to the war capital invested in agriculture in the province was yielding less than 3 per cent in addition to the modest living for the farmer and his family, all of whom might be engaged in productive work on the farm. From evidence obtained by the Provincial Department of Agriculture through the farm surveys in a few of the best farming districts in Ontario we find that, in spite of the excellent prices received for produce, the Ontario farmers do not average much over 5 per cent on capital invested. Few city people will believe this condition possible, but those who know must admit that the actual economic condition of agriculture in Ontario is fairly represented in these farm surveys".

Many schemes calculated to halt the rural decline and restore rural contentment have been put forward, such as rural credits, co-operation in enterprises, and other things, but some of the more advanced thinkers have felt that all these material benefits would follow a proper system of education. It was this opinion that led to the enactment of *The Agricultural Instruction Act* of 1913 which made available to the provinces for agricultural instruction \$10,000,000 of federal money to be expended in ten years. When introducing the bill in the House of Commons the Hon. Mr. Burrell said,

"We, then, in this Parliament, who are making the laws of the nation may well ask ourselves: in what way can we best solve these questions of great national concern? It will not be denied that the safe-guarding of its productive classes is a matter of primary and fundamental importance to the nation. But in regard to the agricultural life of our country it is not alone the betterment of economic conditions that we should aim at, but something finer—the creation of a rural civilization which will at once ensure a fuller and happier life to those in its midst, and prove a source and fount of strength to the state itself. In choosing education or instruction as a desirable line which federal expenditure should take we are following the best methods of the most progressive countries".

This act has been in operation in a quiet, unobtrusive way for five years

and its results are even more pronounced than was expected. Much of the money is spent in agricultural extension work which takes the agricultural college to the farmers who cannot leave their homes to take the courses provided at these institutions. It has made possible the development of the agricultural representative system which perhaps more than any other medium tends to consolidate agencies for community service. There has been no lack of organization. Over organization is sometimes found. Too frequently perhaps the purposes of organizations are selfish, that is they are organized for the protection or advancement of the special business concerned. These organizations, however, be they live stock, poultry, fruit, or dairy associations or farmers' clubs, possess possibilities for the development of what is recognized as the rural community centre movement. They have selected in their officers the leading spirits of the community and this is a long step towards the goal in view. There are other organizations in the country, however, that are more public spirited in purpose. The women's institute stands for much that the community centre idea embodies. This organization, inspired by the highest motives, is ready to grapple with the problems that confront the social life of the rural districts.

The most pressing need is not further organization but rather the co-operation of existing bodies under a leader with vision who can inspire and unite forces for social service and human betterment. To train leaders and inspire them for community work annual summer schools are held at Macdonald College, the Ontario Agricultural College and the Manitoba Agricultural College. Announcements and programmes of these were published in *The Agricultural Gazette* for July. The students consist principally of rural ministers and others devoted to social reform work.

The community life movement is

comparatively new everywhere in Canada. Considerable progress has been made in the Prairie Provinces. It is growing fast in Ontario where impetus has been given it by the Community Hall Act of last session, which was reviewed in the June number of this magazine. In Nova Scotia the movement is engaging the attention of the travelling teachers and others, and in Quebec the rural ministers and extension workers are working together along lines laid down at the summer schools.

In part two of this number officials

concerned with the rural community centre movement in several of the provinces relate the extent and direction of the movement in their respective localities. Officials and rural leaders, who can add from their experience and observations helpful information on methods and programme in the country life movement, are invited to use the pages of this magazine with a view to the standardization of the most successful methods in securing community halls and developing a true community spirit.

THE TRANSPORTATION OF FEED AND LIVE STOCK IN DROUGHT STRICKEN AREAS

ON information supplied by the Acting Minister of Agriculture relative to the scarcity of feed for live stock in certain parts of the provinces of Alberta, Saskatchewan, and Manitoba, an order-in-council was passed on July 29th providing for assistance in the transportation of hay, hay making machinery, and live stock. The area affected consists of all that part of the provinces of Alberta, Saskatchewan, and Manitoba lying roughly south and west of a line drawn from Wetaskiwin to Camrose, north to Chipman, east to Lloydminster, south to Chauvin, then to Elbow, Moose Jaw, Weyburn, Virden, Souris and south to the International boundary. The order provides:—

Subject to the provincial government affected and the railways, either the Canadian Pacific, the Canadian National, or the Grand Trunk Pacific, as the case may be, paying one-third of the cost of transportation of hay from any point outside the dry area, or of transporting hay-making machinery from the dry area to hay-making districts and back to the point of origin, the Dominion government will pay the remaining one-third of the cost of such transportation.

In the case of live stock, where the shipper does not own more than one hundred head of cattle, or three hundred sheep, and wishes to ship live stock not exceeding two car loads over the above-mentioned railways to some

point outside the dry area where feed is plentiful, the Dominion Government will bear one-third of the cost of the railway transportation of such live stock from the dry area to the proposed feeding point, and one-third of the return railway freight from the feeding ground back to the point of origin in the dry area, provided that forward shipment is accompanied by a declaration that stock is moving to pasture land and not for slaughter or sale, provided that such stock is returned before August 1st, 1920, provided that the railways bear one-third of the freight from the dry area to the feeding ground and one-third the cost of return transportation, and provided also that the provincial government affected pay the remaining one-third of the outward bound freight and the remaining one-third of the return freight.

In case, however, that the railways above-mentioned or the provincial governments of Alberta, Saskatchewan, and Manitoba do not agree to bear the above shares of the said costs of transportation of cattle and sheep from and to the dry area via any one of the three above-mentioned roads, then the Dominion government agrees to pay one quarter of the return freight only on such cattle and sheep provided that the railroads pay one-half of the said return freight and the provincial government affected the other quarter.

As the Edmonton, Dunvegan, and British Columbia Railway and the Alberta and Great Waterways Railway are unwilling to make any freight concessions, the Dominion government will assume one-half the transportation charges on hay moving into the dry area, on hay-making machinery moving out of the dry area, and back

to the point of origin, and on live stock being returned to the point of origin from a feeding point before August 1st, 1920, where such transportation takes place over either of these two roads, provided the provincial government will pay the other half in each case.

In case, however, that the provincial government of Alberta is willing to pay half of the outward bound freight on cattle and sheep to grazing grounds, as well as half the return freight, then this government will

undertake to bear the other half of the return freight, where stock is moved over either of these two roads.

The restrictions as to who may ship and the quantities that may be shipped apply to shipments over these roads just as to shipments over the Canadian Pacific, Canadian National, and Grand Trunk Pacific Railways.

It is estimated that the cost of such transportation to the Dominion government will not exceed \$350,000.00.

FINDINGS OF COST OF LIVING COMMITTEE

A SPECIAL Committee with G. B. Nicholson as chairman and H. H. Stevens as vice-chairman appointed on May 30th last to inquire into the prices charged throughout Canada for food stuffs, clothing, fuel and other necessities of life and as to the rates of profit made thereon by dealers and others concerned in their production, presented their first report in the House of Commons on June 4th. The second report presented June 26th outlined the work covered to that date and on July 5th the third and final report of the committee was presented. During its term the committee held forty-eight sessions and examined a large number of witnesses, under oath, upon a wide range of general commodities such as meat, meat products, butter, eggs, flour, fuel, etc., and traced these up through the process of production, manufacture and distribution so as to establish the spread between the cost of production and the cost to the consumer. As a result of these investigations a number of conclusions were arrived at.

CONCLUSIONS

No material reduction in the cost of such commodities as above indicated can be expected except by increasing the volume, by lowering cost of production, or by lowering the cost of distribution.

Having in mind the service which the consuming public demands the

margin between the actual cost of production and what the consumer pays for such commodities is reasonably narrow except in rare cases.

In their investigations on such commodities as beef cattle, hogs, dairy products, eggs, etc., the committee took the base cost paid to the farmer, and, in examining this phase of the subject, had before them representatives of the Department of Labour, the Bureau of Statistics, the Director of Experimental Farms, the Assistant Live Stock Commissioner, a professor from the Agricultural College at Guelph, representatives from the United Farmers of Ontario, dairy-men, packers, cold storage men, grain dealers and commission merchants. On the strength of the evidence of these men it appears that the production cost of these staple articles is from 100 to 115 per cent greater than it was five years ago. The prices of hogs have increased by 125 per cent on the average, beef cattle 110 to 125 per cent, dairy products and eggs 100 to 110 per cent above normal. It may be possible to effect some relief on this point either by fixing a price or by placing an embargo on the export of food stuffs, but either of these things might result in economic disaster. Considering the labour conditions and the cost of stock feed, those engaged in the production of these necessities are not making an undue profit.

The present price of wheat appears to be the most important factor in

the cost of living, as all other food prices in a measure are determined by the price of wheat which, according to the evidence of one farmer, costs two dollars a bushel to produce. While the high price of wheat continues not only will the prices on bread and all cereals remain as they are but the cost of all the other food products must continue to remain high.

Investigating the spread between the base cost and what the consumer pays the committee found that, except in isolated cases of undue profits, the business has been done on a margin of profit reasonably close to actual cost.

In the abattoir and packing house business the companies are making a lot of money in the aggregate but they are doing this because of the efficiency of their methods and their large turnover and not because of excessive profits on the commodities themselves.

In the milling industry the same conditions prevail. The gross margin covering cost of milling and the profits made is about four-fifths of one cent a pound for flour while the net profit averages about one-tenth of one per cent, thus if all the profits in this business were wiped out the possible reduction would be less than one-tenth of one cent on a one and one-half pound loaf of bread.

The same applies to dairy products and eggs. Creameries are taking cream from farmers and manufacturing it into butter at a gross cost of $3\frac{1}{2}$ to 6 cents a pound, varying according to locality and the distance cream has to be hauled. This covers transportation charges, manufacturing cost, boxes, marketing and any possible loss in collection. In this respect the evidence shows that only one creamery made any profit at all and that was a very narrow one. No such thing as cornering of the market prevails. There is direct and keen competition and the markets are wide open.

In the case of the retailers, operations are carried on on a margin

close to the actual cost, and undue high prices are charged in isolated cases only. In this connection the consuming public have it in their power to reduce the cost from five to fifteen per cent by using some of the cheaper grades of meat products or by being satisfied with a less expensive service. In many parts of Canada retail merchants find it difficult to dispose of any but the prime cuts of meat, the result being that the less choice lines must be sacrificed. These things naturally tend to a marked increase of cost of the commodities actually in use. The expense of frequent deliveries at present called for add very materially to the cost of the goods. Lack of diligence in buying is also a factor in increasing the cost.

Another cause of high prices is industrial expansion due to munition making. The big wages offered drew large numbers of people from the rural districts to the cities. This movement in Canada had been in progress for some time before the war but was then accelerated. The result has been a scarcity of labour on the farms and a very considerable reduction in the production of the farms. Many of these people are now loth to return to farming, and there is consequently labour congestion in the cities. It is possible that the only correction for this condition may be the stern alternatives presented by a business depression.

REMEDIES

The specific remedy for these conditions can only be expressed in general terms. "Get our men back into productive industry as rapidly as possible. Every war in the past has resulted in greatly increased prices of commodities and the only way in which nations have been able to rehabilitate themselves in the post-war periods has been by intensive application to productive industry." United effort is needed to restore the waste of the last five years. The committee was of the opinion that the question of co-

operative buying and distribution should be carefully investigated because in all lines investigated the greatest spread was found to have occurred in the distribution from the

manufacturer to the consumer. In the final analysis the solution of the whole problem rests with the people of Canada to seize and make use of the opportunities before them.

CANADA'S AGRICULTURAL INTEREST IN EUROPE

DR. J. W. Robertson has returned from Europe where, at the request of the Minister of Agriculture before the Armistice was signed, he went as a representative of the Dominion Department of Agriculture for the purpose of investigating conditions in the United Kingdom and on the continent with a view to the disposal of Canadian agricultural products and of making arrangements to that end.

Most of his time overseas was given to the work of arranging for the disposal of the balances of the exportable surpluses of Canadian food stuffs which were produced in response to the campaign for increased production during the war. The kinds of commodities dealt with included apples, bacon, beef, packing house offals, poultry, wheat and flour, other grains, dairy products, canned goods, et cetera.

Representations were made to the fruit and vegetable section of the British ministry of food as to the desirability of admitting Canadian apples in barrels and boxes and at a price which would be adequate and satisfactory to Canadian apple growers and shippers. Action was taken by the ministry with results entirely satisfactory to Canada.

After prolonged negotiations the ministry of food decided to purchase an additional quantity of bacon from Canadian packers and then to open the market for free commercial importation and distribution. That course resulted in an active demand for all the Canadian bacon with the result that there is not enough available at the present to meet the demand in the United Kingdom. In the case of frozen beef the ministry agreed to take a large quantity which

had been inspected and marketed in the full expectation, by the packers, that it would be purchased by the ministry. In carrying through the arrangement in this connection seven thousand tons of frozen beef were sold to Italy. That may lead to the opening of a regular trade between Canada and Italy in a class of beef which, being of leaner quality, will be entirely acceptable to Italy although not of a sort which commands the highest price in the markets of the United Kingdom. Dr. Robertson also conversed with representatives of the Belgium government and others with a view to the opening of markets for light weight beef and for the importation of stockers for fattening and of milch cows from Canada for the restoration of dairy herds. The first shipments which have landed in Belgium and France have given entire satisfaction.

Representations were made to the ministry of food as to the claims of Canada to obtain a portion of the very limited cold storage space on ocean steamers in order that these Canadian food products might be carried safely to the British markets in time for distribution to meet the demand from consumers in the United Kingdom. The British ministry used its offices on behalf of Canada with the result that such shipments were made from Canada with satisfaction to the shippers and good service to the consumers in Britain.

The Royal Commission on Wheat Supplies acting for the Inter-Allied Food Council and later for the Supreme Economic Council and also for the British Ministry of Food arranged to take the exportable surplus of wheat as wheat or flour.

It was in connection with those matters that Dr. Robertson accepted the position as Canadian Director of Food Supplies in Europe and membership in the food section of the Supreme Economic Council. It is gratifying to Canadians to know that all the exportable surpluses of food stuffs provided in response to the greater production campaign have been disposed of at satisfactory prices.

Considerable time was devoted to the question of the removal of the restrictions on the importation of Canadian live stock into the United Kingdom. This question of the cattle embargo was taken up with the president of the Board of Agriculture and Fisheries for England and Wales and, with his concurrence, with the Board of Agriculture for Scotland. Later on, with the approval and co-operation of these two bodies, the Canadian case for the removal of the restrictions was presented to the Executive Committee of the National Farmers' Union of Scotland; the Executive Committee of the National Farmers' Union of England; the directors of the Highland and Agricultural Society of Scotland and the Executive Committee of the Scottish Chamber of Agriculture. Valuable assistance in this work was rendered by Mr. H. S. Arkell, Canadian Live Stock Commissioner. Resolutions in favour

of the removal of the restrictions were adopted by some of the bodies before whom the case was laid and recommendations were forwarded by them petitioning the British Government to take action for the removal of the restrictions. Dr. Robertson later discussed the Canadian case with the Parliamentary Committee on Agriculture at the House of Commons. Further steps in this connection remain to be taken at a suitable time.

The distribution of the gift of hand-tools from Canada for the peasant farmers in the devastated regions in France, Belgium, Roumania and Serbia was arranged for. These tools were purchased in Canada by the Agricultural Relief of the Allies Fund. These tools will meet a very real need and the gift has brought forth many expressions of gratitude and appreciation.

At the request of the representatives of Greece, Roumania and Poland Dr. Robertson had conversations with these officials regarding an agricultural policy for the restoration and improvement of agriculture in those countries and was requested and urged to visit these countries to confer with their agricultural leaders. They are looking to Canada for guidance. Such is the reputation which our agriculture has won in Central Europe.

BOARD OF GRAIN SUPERVISORS

HIS Excellency, The Governor General in Council, by an order dated Thursday, the 31st day of July, 1919, appointed the Canadian Wheat Board to consist of not more than ten members, one of whom shall be chairman who shall be chief executive officer of the Board and another assistant chairman. The Board shall make such inquiries and investigations as it deems necessary to ascertain what supplies of wheat are available from time to time, the location and ownership of same, the transportation and elevator facilities

available in connection therewith, as well as all conditions connected with the marketing and market price that can be obtained for same. For the purpose of any inquiry or investigation held by the Board they shall have all the power of a Commissioner acting under Part I of the *Enquiries Act*. The Board shall have power from time to time,—

- (a) To take delivery of wheat in Canada at any point.
- (b) To pay, by way of advance, to the producers or other persons delivering wheat to the Board, such price per

- bushel according to grade or quality and place of delivery for price purposes as shall be set out in a schedule to be prepared by the Board and approved by the Governor in Council, and to provide for the issue of participation certificates to persons entitled thereto.
- (c) To sell wheat so delivered to millers in Canada for milling purposes at such prices and subject to such conditions as the Board sees fit, the price of sale to millers being governed as nearly as may be by the price obtainable at the same time in the world's markets for wheat of equal value, regard being had to the cost of transport, handling and storage.
 - (d) To store and transport such wheat with a view to the marketing of same.
 - (e) To sell wheat so delivered in excess of domestic requirements to purchasers Overseas or in other countries, for such prices as may be obtainable.
 - (f) In co-operation with the Seed Purchasing Commission of the Department of Agriculture, and by sale to such commission or otherwise, to provide for the retention or distribution in various parts of Canada, of such wheat as may be necessary for seed in 1920.
 - (g) To fix maximum prices or margins of profit at which flour and other products made from wheat delivered to millers, may be sold, and to fix standards of quality of such flour.
 - (h) To purchase flour from millers at prices to be fixed by the Board and to sell same in Canada or in other countries.
 - (i) To take possession of and to sell and deliver to millers, or to purchasers in other countries, wheat stored in any elevator, warehouse, or on railway cars or Canadian boats and to deal with the same as to payment of advance and otherwise in the same way as if it had been otherwise delivered to the Board, and to move grain into and out of or through any elevator and to or from any car or boat.
 - (j) To control by licenses or otherwise, the export and sale of flour out of Canada.
 - (k) For the purpose of performing its duties under this Order to allocate Canadian lake tonnage and to distribute cars for rail shipments.
 - (l) To pay necessary expenses incident to the operations of the Board.

"Fairs and exhibitions are the timekeepers which mark the progress of nations. They record the country's advancement; they stimulate the energy, enterprise, and intellect of the people, and quicken human genius. They go into the home; they broaden the daily life of the people, and open mighty storehouses of information to the student. A comparison of ideas and products is educational, and instructs the hand and brain of man."—President MCKINLEY, at Buffalo, on the day of his assassination.

PART I

Dominion Department of Agriculture

DR. S. F. TOLMIE, MINISTER OF AGRICULTURE

DR. Simon Fraser Tolmie, Member of Parliament for Victoria, has been appointed Minister of Agriculture for Canada. Dr. Tolmie succeeds the Hon. Mr. Crerar, who resigned on June 4th. Dr. Tolmie was officially given charge of the portfolio of Agriculture on August 2nd. During the interim the office was administered by the Hon. Mr. Calder, Minister of Immigration and Colonization, in the capacity of acting Minister of Agriculture.

Dr. Tolmie was born on Vancouver Island in 1867. He is a graduate of the Ontario Veterinary College. He operates a farm near the city of Vancouver, giving special attention to live stock. Dr. Tolmie has for a number of years been associated with the federal Department of Agriculture and was an officer of the provincial Department of Agriculture. In 1900 he was appointed a federal veterinary inspector for the port of Victoria. In 1901 he resigned that office and became provincial veterinary inspector for the province of British Columbia. On April 1st, 1904, he returned to the federal service when appointed veterinary inspector for the province of British Columbia. In 1906 he was made also the representative of the federal Live Stock Branch for British Columbia. He held both of these offices until his nomination for the federal election in 1917.

Dr. Tolmie has been closely connected with live stock association work. He holds for the second term the office of president of the Canadian Holstein Friesian Association, as well



HONOURABLE DR. S. F. TOLMIE,
MINISTER OF AGRICULTURE.

as being president of the Western Canada Livestock Union and president of the National Livestock Council.

THE EXPERIMENTAL FARMS THE POULTRY DIVISION

CANADIAN EGG LAYING CONTEST

AN Egg Laying Contest known as the "Canadian Egg Laying Contest" will be conducted by the Dominion Department of Agriculture at and under the direction and management of the Poultry Division, Central Experimental Farm, Ottawa, starting November 1, 1919, and continuing for fifty-two weeks to October 29, 1920, and will be subject to the following rules and regulations:—

1. The Poultry Division of the Experimental Farm will have entire charge of the contest. It will be held upon the plant of the Poultry Division, Central Experimental Farm, Ottawa.

2. The contest will consist of fifty pens of ten birds each.

3. The contest will be open to the world but the management reserves the right to reject or accept any application.

4. Each pen will be trap-nested throughout the fifty-two weeks.

5. The entry fee for each pen will be \$15, \$5 of which must accompany the application, the remaining \$10 to be paid by October 1st. Failure to make this second payment by October 1 will automatically forfeit the first payment and the application will be refused. All fees collected will form a fund for procuring suitable awards.

6. Ten bands will be supplied each contestant and the birds must be banded by the owner before shipment. The bands to be placed on the left leg and having the top of the figures towards the toes. The birds will be known in the contest by the numbers affixed by the owners, thus making it possible for the contestants to trace in the weekly reports the yield of their individual birds.

7. The birds must be delivered at the Experimental Farm, Ottawa, Can., between the 25th and 30th of October, 1919, express prepaid.

8. No extra birds to be held as reserves will be accepted, but the

owner will be permitted to maintain the full compliment of ten birds throughout the contest. Should a bird die, or through accident be incapacitated, the owner may replace her, but no other change will be allowed. If more than two die except through accident, the pen will be disqualified. When a bird is substituted it continues the record of original bird.

9. The management reserves the right to refuse any and all entries, to reject and return to the owner or destroy birds suffering from contagious or infectious disease or that are in any way unsuitable for the contest; to clip the wings of any bird that may be troublesome to yard. To reject birds that may not be standard bred.

10. The birds while in the contest will receive the best of feed and care, the system of feeding will be mixed grain in litter morning and afternoon and dry mash in a hopper before them at all times. They will be kept in 2-pen colony houses having glass and cotton fronts.

11. The contest shall be decided by the total number of marketable eggs laid by each pen. Exceedingly bad shaped eggs, soft shelled eggs, or eggs weighing less than eighteen ounces to the dozen, will not be given official credit.

12. All eggs laid during the contest become the property of the Department of Agriculture and will be sold at market prices.

13. A report of the yields and standing of each bird will be issued at the close of each week. Copies of this report will be sent to each contestant and a monthly summary will be provided the press.

14. If no notification of the disposal of the birds has been received by October 1, 1920, the birds on the completion of the contest will be sent by express collect to the owner's

address from which the shipment was made. Should any of the pens be not laying during the last week of the contest and not likely to lay before the end, the management reserves the right to return the birds a day or two earlier.

15. No persons except the officials of the contest or those engaged with the actual work will be admitted into the pens or yards after the birds have been housed. Every effort will be made to keep the birds quiet and no interference with them or their feed will be permitted.

16. The management will not recognize any sale or transfer of ownership nor shall any entry be withdrawn during the contest.

17. Entry forms will be supplied on application by addressing the Dominion Poultry Husbandman, Central Experimental Farm, Ottawa.

All entries must be received by the Poultry Division before September 1, 1919.

18. Any bird in the contest that lays 150 eggs in the fifty-two weeks will be eligible for registration in the "Record of Performance" and any bird that lays 225 eggs in the fifty-two weeks will be eligible for registration in the "Advanced Record of Performance." No bird that lays eggs that average less than 25 ounces to the dozen during the month of April will be eligible for registration.

19. The management holds itself in no way responsible for loss by fire, disease, vices or unavoidable accidents. While every precaution will be taken, neither the management nor any official of the contest will be held responsible should loss occur.

20. In all cases the decision of the management shall be final.

OFFICIAL RECORD OF PERFORMANCE FOR POULTRY

WHILE the cost of unit production in the poultry business is affected by many conditions, it has been clearly evident for some time that no factor has a more potent bearing on cost than the productiveness of the individual bird. It requires a certain number of eggs to pay for the feed fed and labour expended. The number required varies according to the cost. Profitable production can only be obtained by having a safe margin of eggs over the equivalent of cost, the more eggs per bird the greater the remuneration.

Increased production both in the individual and in the flock has been shown to be largely a matter of breeding. The Record of Performance for poultry is a policy planned to give point, direction and encouragement to the breeding of poultry along lines of greatly increased individual and flock production.

The minimum record to permit a bird to qualify in the Record of Performance has been set at one hundred and fifty eggs in fifty-two

consecutive weeks and for qualification in the Advanced Record of Performance a minimum of two hundred and twenty-five eggs in fifty-two consecutive weeks. The weight and quality of the eggs during the month of April shall not be lower than that of the grade "specials" in the Canadian standards.

Certificates will be issued for all birds qualifying in the Record of Performance. The birds that qualify shall also be identified by a sealed band and the numbered registered.

The Record of Performance for poultry is to be divided into two parts—"A" and "AA".

RECORD OF PERFORMANCE "A"

This is to consist of the inspection of trap-nested flocks on individual poultry plants and shall be similar in form to the Record of Performance for dairy cattle. It will be open to any breeder that wishes to enter his flock and will be under the supervision and inspection of officers of the Poultry Division of the Live Stock Branch.

RECORD OF PERFORMANCE "AA"

This will consist of the conducting of tests under government supervision and on government or neutral ground, for the purpose of obtaining an official record by actual trap-nest results.

This official test may be conducted by either federal or provincial government or colleges and may be secured by:

1. "Laying Tests."
2. "Laying Contests."

Record of Performance "AA" will be under the supervision and direction of officers of the Poultry Division of the Experimental Farms Branch.

OFFICIAL REQUIREMENTS OF ENTRANTS IN RECORD OF PERFORMANCE "A"

All entries shall be made upon forms supplied by the department and subject to departmental rules and regulations. Applications for entry must be dated and mailed one month in advance of the date it is desired the record shall commence. For purposes of organizations during the present year 1919, applications will be received for individual birds to commence their records on the 1st of September, the 1st of October, the 1st of November and the 1st of December. There shall be an entry fee of one dollar (\$1) for the first ten birds entered and five cents (5c.) for each additional bird.

Only pure bred stock of standard varieties and free from standard disqualifications may be entered. The minimum entry shall not be less than ten birds from any one flock. All stock entered shall be trap-nested during the period of the official test, which in no case will exceed fifty-two weeks. All equipment on inspected plants shall be kept in a clean and sanitary condition. Records shall be kept posted up to date at all times for the information of visiting inspectors. Only eggs actually found in trap-nests shall be counted.

Entrants shall use prescribed record forms. These shall consist of weekly house records and monthly or yearly book records. The weekly records

shall be mailed regularly by the breeder to the department. The fullest information shall be given to official inspectors and any entrant who offers opposition renders his entry liable to cancellation.

METHODS OF INSPECTION

All flocks will be placed under systematic, periodic, unannounced inspection. Official visits will be at irregular intervals; they may average once a month or more frequently as occasion demanded. The general health, condition of the stock, current productiveness and the ordinary physical and visual tests of egg laying will be used by inspectors in checking the accuracy of the records. Inspectors required for the Record of Performance will be chosen by special Civil Service examination. In case of an inspector's decision being questioned by the owner of the flock, another examination by the inspector may be given or, at the option of the department, another inspector may be sent. In either case a second inspection by the same or another inspector will be considered final. For further particulars in reference to Record of Performance "A" inquire of the Poultry Division of the Dominion Live Stock Branch, Ottawa.

**RECORD OF PERFORMANCE "AA"
GENERAL INFORMATION**

Laying Tests and Laying Contest both will be used as mediums to obtain the qualifications for entrance to the Record of Performance. The major portion of tests and contests will be conducted by the experimental farm upon its central and branch farms but provincial departments of agriculture and colleges also may conduct these.

Laying tests are distinguished from contests in that they are not competitive, but merely for the purpose of obtaining an official record of production. As low as three birds and up to five may be entered in a test. At present complete arrangements are made by the Dominion Experimental Farm to hold these

tests at all of its farms throughout the Dominion.

The laying contests will be conducted this year as follows: World's Contest at Central Experimental Farm, Ottawa, on the Branch Farms at: Charlottetown, P.E.I., Nappan, N.S., Cape Rouge, Que., Brandon, Man., and Indian Head, Sask. All contests have ten birds to pen and start November 1st continuing for fifty-two weeks.

Applications for both tests and

contests on the Experimental Farms must be made before September 1st, but as the number which can be accommodated is limited, it is advisable to make application early. Entry blanks, rules and regulations, may be secured from the Poultry Division, Experimental Farm, Ottawa.

All birds in tests or contests that qualify for Record of Performance or Advanced Record of Performance will receive the certificate of registration.

THE ENTOMOLOGICAL BRANCH

THE CORN EAR-WORM IN CONSIGNMENTS OF IMPORTED TOMATOES

BY ARTHUR GIBSON, CHIEF, DIVISION OF FIELD CROP AND GARDEN INSECTS

DURING recent years the Corn Ear-worm, *Heliothis obsoleta* Fab., has on occasions been introduced into Canada in tomatoes, in crates, shipped from States in the

Fruit Branch of the Department of Agriculture. The caterpillars were conspicuously abundant in an important shipment of tomatoes consigned to a large wholesale produce



IMPORTED TOMATO SHOWING INJURY BY THE CORN EAR-WORM. PULP AT THIS TIME PARTLY DECOMPOSED. CATERPILLAR FEEDING AT RIGHT. (Original).

southern portion of the United States. Such an introduction was called to our attention towards the middle of July of the present year by Mr. C. H. Snow, Fruit Inspector of the

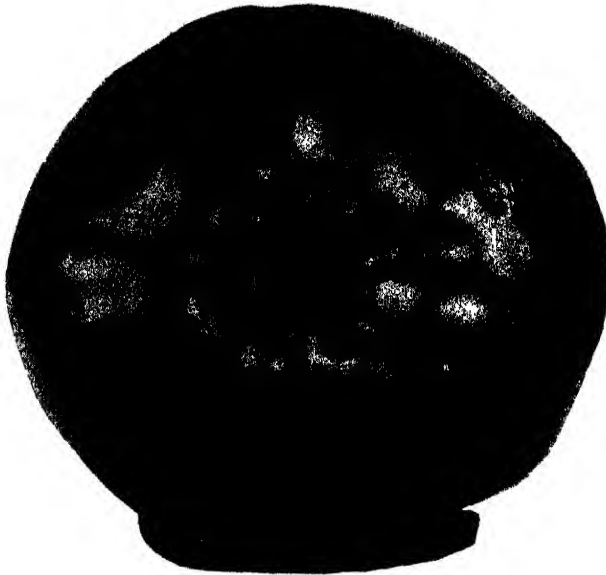
dealer of Ottawa. The shipment in question, which originated in Tennessee, was investigated by the writer on July 15th. There was no difficulty whatever in finding the cater-

pillars, every example seen being in its final stage of development. The illustrations herewith indicate the destruction caused to imported tomatoes by these larvæ. Mr. Snow, when reporting the infestation, stated that the caterpillars were present in large numbers in the warehouse at the time of his visit. In some of the crates examined by the importer, every tomato, with the exception of three or four, was found to be infested.

In the latter half of June, 1913, shipments of tomatoes from Texas

Ottawa, large cavities had been eaten out as shown in one of the illustrations herewith; in other fruit, the larva had entered at the stem end, and in some examples little apparent injury had been effected. Close examination, however, showed large excavations where the caterpillar was feeding.

The insect has, of course, long been known as a pest of more or less importance in eastern Canada, its injuries having been practically confined to sweet corn during the period when the corn is in the ear.



IMPORTED TOMATO SHOWING STEM END INJURY AND EXCAVATION WITHIN. (*Original*).

consigned to dealers in Toronto were similarly infested. The only other record we have of the Corn Ear-worm being found in tomatoes imported from the United States is the one referred to by Fletcher in his report for 1893. In this latter case the larvæ were discovered in the fruit brought into London, Ont., the importer stating that he had found over a dozen larvæ in each crate of tomatoes.

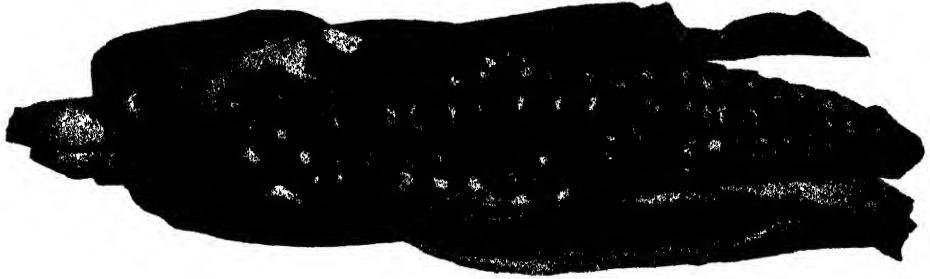
The Corn Ear-worm is certainly capable of making a disgusting mess of the pulp of the tomato. In some of the fruit imported this year into

Owing to this latter injury it owes its adopted name. It has also been called the Corn Moth, and in the United States the Tassel Worm, the Cotton Bollworm, the Tomato Fruit-worm, and the False Budworm of Tobacco. The insect is found in many countries, in fact, it is cosmopolitan in distribution. In Canada it occurs more or less abundantly, during intermittent periods, particularly in Ontario and the other eastern provinces. It has also been complained of in Manitoba and Saskatchewan.

There is probably little likelihood

of seriously establishing the pest further in Canada through infested importations of tomatoes owing largely to the fact that the caterpillar is so easily detected and would undoubtedly be destroyed immediately with the fruit. However, as the larvæ at such times are still feeding actively, there is, of course, the possible chance, through careless handling of the infested fruit, of establishing what might lead to an important outbreak provided conditions in general were favourable.

destructive, injuring as much as 95 per cent of the ears of both sweet corn and yellow field corn. As a rule, the caterpillars do not appear until late in the season. In 1916, they were found injuring corn in New Brunswick on August 21st. In another year they occurred destructively in Nova Scotia in the first week of September. In the Ottawa district we have occasionally found the larvæ working in early September. On September 5, 1916, mature larvæ were found and an injured cob



EAR OF SWEET CORN SHOWING INJURY TO KERNELS BY CORN EAR-WORM. (*Original*).

INJURIES IN CANADA TO CORN

As mentioned above, injury by the Corn Ear-worm in Canada has in the past been confined largely to the eastern provinces, sweet corn in the cob being the crop principally attacked. Fortunately, we have only a few records of really important injury by the caterpillars. One of these refers to an outbreak which occurred in 1898 in the district of Orillia, Ont.; the report received stated that the larvæ had been very

photographed, from which the accompanying illustration has been made. In western Ontario they have been found in September and also in October.

The caterpillar when mature is from about one and one-quarter to one and a half inches in length. It varies in colour from a light green to dark brown, with rather indistinct stripes on the back, and a wider, conspicuous, pale-coloured band along the side. The head is of a yellowish-brown colour.

PROFESSOR CLEMENT APPOINTED DEAN OF AGRICULTURE

Professor F. M. Clement, B.S.A., has been appointed dean of the Faculty of Agriculture of the University of British Columbia, succeeding Dean L. S. Klinck, who has been made President of the University. Dean Clement has been head of the Department of Horticulture since 1916, when he relinquished the position of Director of the Horticultural Experiment Station at Vineland, Ontario. Dean Clement was brought up as a fruit grower in the Niagara district, and is a graduate of the Ontario Agricultural College.

DAIRY AND COLD STORAGE BRANCH

DAIRYING INSTRUCTION IN THE SCHOOL

TO encourage the study of dairying in the public schools of Nova Scotia, Mr. H. R. Brown, Supervisor of Cow Testing in that province for the Dairy Branch, persuaded a number of teachers to offer inducements for the writing of essays on dairying.

To assist the movement, Mr. Brown prepared a short bulletin entitled "Short Lessons on Dairying," which was published by the Dairy Division of the Nova Scotia Department of Agriculture. Professor De-Wolfe, Director of Rural Science, brought this pamphlet, and the purpose behind it, to the attention of the travelling rural science teachers who were working in different parts of the province. These teachers, in turn, took special lessons in dairying at the Agricultural College, Truro. Each travelling teacher has had supplied to her a milk testing outfit in a suitable carrying case. These are used to demonstrate milk testing at the schools. To further encourage this work, a number of the local

agricultural societies, besides farmers and business men, contributed funds for prizes for competitions in essay writing on dairying by the students. The work went even beyond this, as the Nova Scotia Dairymen's Association offered grand champion prizes of \$12.00 for the best essay on dairying prepared by a public school pupil in the whole province, and \$8.00 or the teacher of the school making the highest average score. Altogether 67 different prizes were offered. About 225 pupils competed and it is estimated that approximately 600 others were indirectly influenced to study dairying to a greater or less extent.

Considering that this was the first year that the competition was attempted throughout the province, that the "flu" epidemic interfered with all forms of school work and that a good deal of the money for prizes only became available late in the term, this competition must be considered a decided success.

LIVE STOCK BRANCH

FEDERAL AID TO FAIRS AND EXHIBITIONS

THE assistance given to fairs and exhibitions by the Federal Department of Agriculture is of two kinds. Judges are provided whose salaries and expenses are defrayed in part by the Department, and grants of money are made to fairs based on the prize awards of the exhibition boards of the various provinces. The plan of assistance is clearly outlined in the two articles following.

JUDGES

Shortly after the Dominion Live Stock Branch was formed the Live Stock Commissioner started the

scheme of supplying judges for the leading Fairs both East and West. The original scheme provided for the paying of the salary and expenses of a judge from his home to the Fair and again on the return journey, while the Fair Board paid the salary and expenses during the time the judge was at work. When a province arranged for the services of a number of judges to judge a circuit of Fairs the Branch paid all expenses to the first Fair and from the final Fair. Many Fairs, however, got their judging done for a number of years at least, without paying charges of any kind. Fairs in the Province of

Quebec were supplied with judges free of charge. During the last four or five years, all Exhibitions and Fairs were required to comply with the regulations by paying salary and expenses of judges while at work.

In the beginning this policy was of particular advantage as it insured the sending of experienced judges and at the same time it brought the breeders in touch with other breeders not only from different provinces but also from distant parts of the Dominion. In certain sections it had much to do with the establishing and fixing of type as well as the encouraging of better breeding, feeding and management. The judges sent out were not only able to judge but also discuss with the Show men various phases of the live stock industry and to advise where improvement might be made.

During the last couple of years it was felt that the work of supplying judges to any but the largest Fairs should be carried on by the provinces. Accordingly, this year it was decided to confine this help to such Fairs only as qualified for the federal grant which is also made through this Branch to certain shows that attain to a required standard. The conditions under which Judges will be supplied to these shows are as follows:—

(1) The Live Stock Branch, as heretofore, will pay the salary, living and travelling expenses of a Judge from his home while going to and returning from the place where the Fair is held. The Fair Board shall pay the expenses and salary at the rate of not less than ten dollars per day for the time the judge is engaged at the Fair.

(2) A Fair Board wishing to obtain the services of a Judge shall apply to the Live Stock Branch a reasonable length of time before the show is held, enclosing at the same time, if it is wished, the names of one or more Judges as the case may be that would be acceptable. The Live Stock Branch in making a selection of Judges will give consideration to such

recommendations and shall send such men as are known to be capable and efficient Judges though not necessarily those recommended.

(3) The Fair Board shall under no consideration communicate with or arrange for Judge and then write the Branch asking that these men be sent. All communications in regard to Judges must be sent to the Live Stock Branch direct. Fairs whose Boards or Managers fail to comply strictly with these regulations will be struck off the list of those eligible to receive this help.

(4) Each Judge supplied by the Branch must work alone. In no case will two or more Judges be allowed to work together except in awarding Grand Championships, and then only when the animals competing have been judged by different Judges. In such cases the original Judges may work together. This regulation must be strictly adhered to by both Fair Boards and Judges.

(5) All Fair Boards, wishing to take advantage of this assistance, upon receipt of this letter should write the Live Stock Branch stating that the terms under which the Branch is prepared to supply Judges are acceptable and that the regulations will be complied with. It will be taken that Fair Boards failing to reply do not desire to take advantage of this offer. Fair Boards that do not wish to accept and comply with the above regulations have the option of getting their own Judges.

The Branch feels that a great deal of good can be done by the exchange of Judges. By this is meant that Judges from the eastern provinces should be sent to the western exhibitions while western Judges should be brought East. Judges can also be exchanged between provinces. Thus the stockmen of the various sections of Canada are brought together, which should be of mutual advantage for all parties concerned. It is the intention to give a large number of breeders who are capable Judges a chance of getting out and not only of

meeting the breeders of other provinces but of seeing conditions at first hand.

GRANT TO FAIRS

In 1903 the Department of Agriculture through the Live Stock Branch decided to make a yearly grant of \$50,000 to a certain Fair which was to be known that year as the Dominion Exhibition. The grant was to go to an exhibition in each province in rotation. The first grant was made to the Toronto Association. One exhibition in each province in turn was awarded this grant with the exception of Prince Edward Island. Charlottetown, however, was given a grant of \$10,000 when the Dominion Exhibition was held in Halifax and a further grant of \$10,000 at a later date. This grant was paid yearly until 1913. Victoria Exhibition had been awarded the grant for 1914 but owing to the outbreak of war the exhibition was not held and accordingly the grant was not paid that year.

In 1915 the Dominion grant to a single fair was done away with and replaced by a policy which aimed at aiding all of the larger fairs and to keep them running during the war. This policy provided for a grant of fifty per cent to such fairs as paid out at their last preceding show the sum of at least five thousand dollars in the utility classes of Horses, cattle, sheep, swine and poultry. The minimum grant paid to such fairs was \$2,500 and the maximum which any fair might obtain was \$5,000. Owing to wartime conditions special cases had to be made as some of the fairs found it impossible to qualify certain years. Where no exhibition in the province qualified a grant of \$2,500 was made to the one that came nearest to complying with the regulations. This policy had the effect of keeping many exhibition boards from closing their gates, and thus very materially aided and encouraged the live stock industry at a time when such encouragement was greatly needed.

In 1917 the regulations were changed by which fair boards were required to spend at their last preceding exhibition a minimum of \$4,000 of their own money for prizes in the utility classes in order to obtain a grant of \$2,500, which had also to be expended in the live stock classes. Fairs expending over \$6,500 were paid fifty per cent of such expenditure, the maximum in no case exceeding \$5,000.

This year the regulations have been made somewhat easier. In order that they may be given publicity they are quoted in full:—

"Exhibition Associations whose shows are open in all classes to the whole of Canada and which shall have expended at their last preceding show a minimum of \$3,600 of their own money for prizes in the utility classes of live stock and poultry, shall be eligible to receive a grant from the Department, in accordance with the following conditions:—

1. To fairs which shall have expended at their last preceding show a minimum of \$3,600 of their own money for prizes in these classes, the Department will offer a minimum grant of \$2,500.

2. A fair which received a grant in 1918 must have expended for prizes in these classes a minimum of \$6,100 of which expenditure \$3,600 must have been provided by such fair association.

3. A fair expending for prizes in these classes a sum in excess of the minimum of \$6,100 shall be entitled to receive an additional grant to the extent of one-half such excess sum.

4. The maximum grant, in no case, shall exceed \$5,000.

Illustration.

A fair has expended at its last preceding show, \$9,000 for prizes in the utility classes of live stock and poultry. Such fair is entitled to the minimum grant of \$2,500. It is further entitled to a grant of one-half \$9,000 minus \$6,100 or.....
\$1,450. Such fair is, therefore, eligible for total grant of\$3,950.

Winter Fair and Spring Show Associations whose shows are open in all classes to the whole of Canada and which shall have expended at their last preceding show, a minimum of \$2,500 of their own money, for prizes in the utility classes of live stock and poultry, shall be entitled to receive a grant from the Department, in accordance with the following conditions:—

1. To fairs which shall have expended at their last preceding show a minimum of \$2,500 of their own money for prizes in these classes, the Department will offer a minimum grant of \$2,500.

2. A fair participating in the grant must expend for prizes in these classes a minimum of \$5,000 comprising \$2,500 of its own money and \$2,500 the amount of the grant from the Department.

3. A fair expending for prizes in these classes a sum in excess of the minimum of \$5,000 shall be entitled to receive an additional grant to the extent of one-half such excess sum.

4. The maximum grant, in no case, shall exceed \$5,000.

Illustration.—A Winter Fair or Spring Show has expended at its last preceding show, \$7,000, for prizes in the utility classes of live stock and poultry. Such fair is entitled to the minimum grant of \$2,500. It is further, entitled to a grant of one-half \$7,000 minus \$5,000

or \$1,000. Such fair is therefore eligible for total grant of \$3,500.

General Conditions.—An exhibition association, when making application to the Live Stock Branch for this grant, must forward a certified and properly subscribed statement of the auditor's report of all prize money paid out at its last show, in the classes previously referred to, as also a copy of the proposed prize list for the succeeding year. The revising of the prize list shall be subject to the approval of the Live Stock Commissioner.

All pure bred live stock exhibited at shows which receive the benefit of this grant must be registered in the name of the exhibitor in the Canadian National Live Stock Records.

In all questions of policy or matters of dispute, the decision of the Live Stock Commissioner shall be final.

Special provision.—In the case of any province in which no fall exhibition, winter fair or spring show qualifies for the grant under the conditions above set forth, an exception may be allowed as regards strict adherence to the required minimum expenditure of \$3,600 by a fall fair or \$2,500 by a winter fair or spring show, imposed as a condition to the making of the grant. In such case, the Department may offer a minimum grant of \$2,500 to one fall exhibition only or to one winter fair only in such province, such exhibition or fair to be that which most nearly qualifies for the grant under the conditions of the policy.

FEDERAL SERVICES TO FACILITATE MARKETING

BY W. R. REEK, B.S.A., ASSISTANT LIVE STOCK COMMISSIONER

ENCOURAGEMENT of co-operative effort on the part of egg and poultry producers has been given by this Department for several years. Quality must be maintained throughout, if the returns are going to be satisfactory under present conditions. British Columbia, Alberta, Ontario and Prince Edward Island have co-operated quite closely

in this regard and in each province except Ontario, central candling stations have been established to which the eggs are shipped, candled, and from there marketed.

A weekly market report, giving concise information regarding conditions and prices, is prepared and forwarded to any one requesting it. In addition, daily wires are sent

collect to the various candling stations and to co-operative organizations requesting same. The information contained therein is collected from the various centres throughout Canada, and is now being supplemented by cables from Great Britain.

Inspection of eggs for export or interprovincial shipments is being made. On interprovincial shipments of 100 cases or more, and on export shipments 5 per cent samples are drawn and approval is given for the shipment if according to grade.

The result of the above work has been that Canadian eggs now hold premier position in Canada, whereas heretofore at certain seasons they were outclassed by the imported American product. They are also competing on the British market and prospects are excellent for future trade.

The question of shipment of dressed poultry on a similar basis is being considered.

ASSISTANCE IN THE MARKETING OF LIVE STOCK

Officers of this Branch are stationed on each stock yard, primarily to give assistance in the marketing. They assist farmers who wish to purchase or who desire to sell. They look after the grading and will, after August 21st, be responsible for the carrying out of the regulations for the proper management of all public live stock yards. The assistance offered through these men has been much greater in the Western than in the Eastern part of Canada. The underlying idea in the work is to foster the marketing of the raw product on an open market where competition will be normal. It is also hoped that there will be the utmost confidence created between the farmer and the legitimate salesman on the markets. In this way our live stock markets will become stronger. Much assistance has been given in the prevention of the slaughter of good breeding stock, and this work will be carried on as energetically as possible in the future.

A weekly market report is prepared and issued, showing the number of stock passing through the yards, the various classes and prices. The districts from which the stock came and to whom they were sold and for what purpose are also noted on the office records. In this way it will be only a short time before we will be able to discern improvement or deterioration in stock from any district in Canada. Change of breeds will be noted: quality and quantity will be easily registered: also it is arranged so that if the co-operation of those in the trade can be secured, we will be able to give to anyone detailed information regarding the live stock industry in any part of Canada. Assistance by the men at the yards will be given to any co-operative organization requiring same.

Arrangements have been made for daily wires between the various yards in Canada and for a bi-weekly service from the large American yards and for publication of our reports through the Associated Press.

A representative has been placed in Eastern Ontario to co-operate with societies, district representatives or others, to encourage co-operative marketing.

CO-OPERATION WITH PROVINCES MARKETING LIVE STOCK

Definite arrangements have been made with the Governments of Ontario, Alberta and Prince Edward Island regarding the marketing of live stock and poultry products. This arrangement has been entered into to eliminate over-lapping and for the express purpose of close co-operation between the various officials in order to get maximum results. The Live Stock Branch makes a special study of the markets. The provincial men are in a position to do the educational work. In New Brunswick and in Quebec men are being placed to work in conjunction with the provincial authorities in poultry and live stock work. These men will commence their duties very shortly.

THE REMOVAL OF MALE BIRDS FROM THE POULTRY FLOCK

BY ERNEST RHOADES, B.S.A., POULTRY DIVISION

THE removal of the male birds after the breeding season was one of the first lines of propaganda work undertaken by this Branch and from the beginning it was given special emphasis in the organization of all egg circles. In fact it was one of the first lines advocated in the culling of laying flocks. During the past three years, since the tests of productiveness have been definitely known and suitable for application in a practical way, the activities of this Branch among egg circle members have been directed more to the giving of demonstrations of the culling of flocks as a whole.

The drones and boarders have been removed from the flock and so well has the lesson of this been driven home that, except in cases of special breeding ability, it is now the definite practice of egg circles in many parts of the country to dispose of their male birds after the breeding season. The whole prospective now is in the direction of economic improvement of stock by the removal from the flock of all unproductive or unprofitable stock. During the past year culling demonstrations were given on farms and approximately 25,000 head of poultry were removed from the flocks inspected. From some flocks as much as 40 or 50 per cent of the stock has been sold without any

noticeable falling off in the egg production.

The following information contained in Leaflet No. 2, of the Poultry Division indicates the importance placed upon this action of egg producers by the Live Stock Branch:

"Eggs which have been fertilized constitute the greatest proportion of the inferior stock which, when examined, proves unfit for food. It is not necessary that these shall have remained for a time under a broody hen, a temperature of seventy degrees being, in itself, sufficient to cause the germ to commence to grow. If the heat is constant, the development of the chick will continue but if it ceases or is intermittent, putrefaction at once sets in and the egg becomes bad. On the other hand infertile eggs which are free from the active germ cell, do not, under ordinary conditions, deteriorate seriously.

Few farmers seem to realize these facts, and consequently very few make any effort to insure infertility. The impression prevails among many, that the presence of the male bird in the flock is essential to the production of a maximum number of eggs. This assumption is erroneous, and has been proven, time and time again, to be absolutely without foundation.

Farmers and others selling eggs for market are recommended to kill off or dispose to the male birds after the breeding season. As a result of their remaining with the flock after June 1st, Canadian farmers lose each year at least a million dollars, through the presence of partially incubated eggs in the produce which is marketed. The fact that the best trade in many cities in Canada now offers the premium of from one to five cents per dozen, for non-fertilized eggs, suggests an additional financial consideration which but few can afford to overlook."

ROBERT NEWTON APPOINTED ASSISTANT PROFESSOR OF FIELD HUSBANDRY

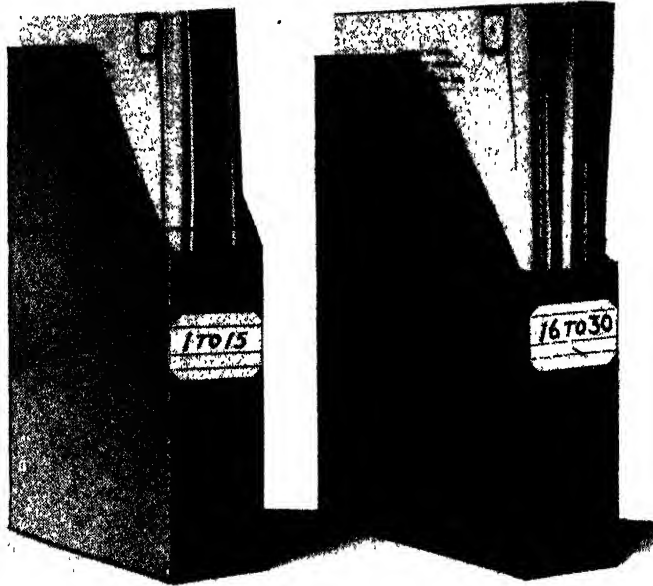
After returning from overseas, where he served three years in the Canadian Field Artillery in France and won the Military Cross in 1917, Mr. Robert Newton, B.S.A., has been appointed assistant professor of field husbandry in the University of Alberta. Mr. Newton before going overseas, was director of agricultural instruction in the province of New Brunswick under *The Agricultural Instruction Act*. He is a graduate of Macdonald College, and was for a time Macdonald College demonstrator in the Ottawa Valley and, later, for a period of one year, assistant Dominion Cerealists in the Experimental Farms System.

PUBLICATIONS BRANCH

A PUBLICATION FILING SYSTEM

FOR the convenience of those who receive the bulletins and pamphlets of the Department of Agriculture the Publications Branch has devised a simple system of filing. It is realized that even though the publications as received by the hundreds of thousands of farmers, gardeners, and others on the mailing lists of the Publications Branch, are carefully read, the human

includes an index book or a card index and the use of simple cardboard filing cases. For farm use an index book has been considered a sufficient record. A suitable book has therefore been published for distribution free. The book provides for the entering of titles under subject headings in alphabetical order as follows: Bees, Building Construction, Dairy, Feeds and Feeding, Field



PUBLICATIONS FILING CASES AS USED.

The pamphlets contained in the left-hand file number from one to fifteen, and in the other from sixteen to thirty, regardless of subject.

mind is not able to retain all of the detailed information contained in these pamphlets. It is important, therefore, that the publications be kept for future reference, and in such order as to be quickly accessible.

The system evolved by the Publications Branch embodies modifications of various methods in use that have been adopted by departments of agriculture. The system

Crops, Insects and Plant Diseases, Live Stock, Orchard and Garden, Poultry, Tobacco, Miscellaneous. Three leaves are given to each subject. The book is thumb indexed so that when it is opened a subject section is readily located.

As bulletins are received from the department the index number should be entered on the right-hand upper corner of the front cover. This

number should be next higher than that appearing on the latest publication previously received and filed. This becomes the index number of the publication, the title of which is entered under its proper subject heading in the index book. After being numbered and entered in the index book the publication is placed in the file in the order in which it should always be found when not in use.

For the use of those who have not already an equipment for filing the publications in upright position, an

inexpensive filing case has been devised in two styles. First is a collapsible form, made from tough cardboard only. The second is a more substantial form, already made up, and covered with cotton material. While the index book is supplied free to applicants the filing cases are sold at the manufacturers' cost of fifty cents per half dozen for the collapsible form represented on the left in the illustration, and twenty-five cents per case for the more substantial cotton-covered case shown at the right.

SEED BRANCH

SEED TESTING 1918-19

BY JOHN R. DYMOND, B.A., SEED ANALYST

THE object of seed testing is to determine as accurately as possible before seed is sown the nature and vigour of the crop that will result from its use.

Farmers send samples to the seed laboratory to determine their suitability to be used on their farms or to be sold to their neighbours. Merchants use the laboratory to learn how their seeds should be graded or labelled to comply with the requirements of the Seed Control Act. Samples are also tested for various organizations whose object is the improvement of Canadian agriculture. The Canadian Seed Growers' Association the Seed Purchasing Commission, various seed fairs and institutions have had free seed tests made during the past year. The number of samples received from merchants, farmers, and institutions at the Ottawa and Calgary seed laboratories during each of the past few years, was as follows:—

	1917-8	1916-17	1915-16	1914-15
Ottawa—				
13,084	12,431	13,248	11,517	
Calgary—				
11,892	13,547	8,215	8,412	

From July 1st, 1918, when the present laboratory year commenced, to

March 31, 1919, 27,239 samples were received in the three laboratories as follows:—

Ottawa.....	10,425
Winnipeg.....	8,073
Calgary.....	8,741

The Winnipeg laboratory was opened in October, 1918. That there was need for a seed control station at this point is shown by the fact that such a large number of samples was received within the first few months the laboratory was in operation.

TESTING FOR FARMERS

Seed testing is especially important to the Western grain grower because the vitality of his grain is more often impaired by frost than is that in other parts of Canada. About 85 per cent of the samples received at Calgary and Winnipeg are sent by farmers or agricultural organizations, and consist chiefly of grain to be tested to determine its vitality. A considerable proportion of the samples are tested for purity as well as vitality, and the sender is advised as to the kinds and numbers of weed seeds which his grain contains.

Of the samples of Western oats examined last season nearly 90 per

cent contained noxious weed seeds of one or more kinds. About 80 per cent contained wild oats at the average rate of 65 per pound of grain. A very low percentage of the samples of oats received during the average season will make first class seed. The proportion is higher in the case of barley and wheat, especially the latter.

In Eastern Canada the vitality of the grain produced is usually satisfactory, although it is always advisable for farmers to have every lot of seed tested for purity and vitality before it is sown. Most of the testing required of the Ottawa laboratory is in connection with the grading of timothy, red clover, alsike, and alfalfa. During the seed testing season of 1917-18, 2,712 samples of timothy, 2,199 red clover, and 1,730 alsike were tested at Ottawa. A large proportion of the samples are sent by dealers, but an increasing number of farmers are having their clover and grass seeds tested before using or selling them.

TESTS OF IMPORTED SEED

The testing of samples of seeds required in the enforcement of the order in council regulating importation has added very materially to the work of the seed laboratory during the past season. At Ottawa, for instance, 2,143 samples were received from the Customs Department up to March 31, 1919.

OFFICIAL AND INVESTIGATION TESTS

During the last seed testing season 563 official samples taken by seed inspectors in connection with the

enforcement of the Seed Control Act, and 1,199 samples of vegetable seeds in paper packets, were tested. Several thousand other tests were made in connection with investigations into the quality of seed being used by farmers, methods of sampling bulk lots of seed to secure representative samples, and other lines of research.

FROZEN OAT INVESTIGATION

Last summer Mr. J. R. Fryer, M.A. of the Calgary laboratory, commenced a study of the effect of frost on the vitality of oats. The aim of this work is to determine the injury to the vitality of oats at different degrees, and to learn the precise physical effects of such frosts, so that, if possible, frost injury may be recognized and its extent approximately determined by inspection. The work done last season was preliminary and it is unsafe to draw any conclusions from the work of one year, but in general it may be said that there are strong reasons for suspecting that some very prevalent ideas in regard to the effect of frost on oats are erroneous. The investigation is being continued and enlarged.

EDUCATIONAL WORK

The laboratories are continuing the work of supplying material and other assistance to schools where seed studies are taken up. By this means, and through the agency of official publications and the farm press, it is aimed gradually to improve the knowledge possessed by our farmers in regard to qualities of good seed and the importance of using only the best.

PART II

Provincial Departments of Agriculture

RURAL COMMUNITY CENTRE MOVEMENT

NOVA SCOTIA

BY L. A. DEWOLFE, B.A., M.SC., DIRECTOR OF RURAL SCIENCE

THE Rural Community Centre Movement is being tried in a small way in Nova Scotia. The travelling rural science teachers have made a beginning in their districts.

We have found the school exhibition a good medium through which to introduce other community activities. At the exhibition the people come together and they learn of the widened meaning of education. Public speakers emphasize the value of the exhibition; and from this indicate additional motives for bringing children and parents together.

In no one school section has the movement been tried in its entirety. Some sections put on plays by the school children, to which the parents are invited. Others hold debates. Still others organize clubs for various purposes.

The Dairymen's Association, the Women's Institutes, the Children's Aid Societies, the Cow Testing and Agricultural Societies all hold meetings to discuss co-operation with the schools. Such meetings frequently end with lunch and a social hour. This year one school section at least has announced its intention to include a social evening with the annual school meeting. Another section had a Community Thanksgiving dinner in the school house last October.

The clergy are doing more than ever to bring the church and the school together in a social way. They are learning that only through social activities will the church be able to attract and hold its young people.

It may be noted, therefore, that, while we have no outstanding instances to herald abroad, the signs of the times are hopeful.

QUEBEC

BY W. LOCHHEAD, B.A., M.SC., MACDONALD AGRICULTURAL COLLEGE

THE Rural Movement began in the English-speaking sections of the province about ten years ago, when two or three clergymen became actively interested in rural welfare from a community standpoint. The late Rural-dean Robertson, of Cookshire, Compton Co., organized the farmers of that district and became their recognized leader until the time of his death, about four years ago. He recognized the close relationship between good

farming and religion, and endorsed the view that the church should not only "make men fit for heaven, but the earth fit for men." Like Pastor Oberlin of Alsace he spent himself on behalf of his people that they might have greater happiness through greater efficiency in everything pertaining to rural life.

The late Rev. H. A. Dickson of Rectory Hill, Megantic County, did a similar work of organization for rural improvement. For some years

he had charge of two churches and he was the foremost fruit grower in his district. He believed it to be his business to preach scientific apple-growing in his district where more apples should be grown, and his most impressive service was to raise splendid crops of apples by proper attention to his trees. Mr. Dickson became the leader among his farmers for a better livelihood, a more satisfying environment, and a higher ideal of personal and community life.

These two clergymen leaders are no longer living, but although dead they still speak. Their influence has been very marked in their own communities.

In October, 1913, the writer addressed the Quebec Congregational Union at Cowansville on the "Rural Community and the Church," and touched a responsive cord in the hearts of the ministers present. So far as the writer is aware no further special appeal was made to the ministers until October, 1917, when a special session was devoted to the Rural Problem at the Conference of the Alumni in connection with the Fiftieth Anniversary of the Montreal Presbyterian College. At this Conference the writer had the privilege of speaking again upon the subject, "The Rural Community and the Church," and at its conclusion the following resolutions were brought in and adopted by The Committee of Resolutions:

"That this Committee seek to make arrangements with Macdonald College for a Summer School on the Rural Problem in 1918. That we urge a closer co-operation between country and city churches that the one may understand and appreciate the problem of the other."

As a result of the first resolution, the Union Theological College of Montreal, in which the Anglican, Presbyterian, Methodist and Congre-

gational Colleges co-operate, made arrangements with Macdonald College for a Summer School for Rural Improvement in August (5th-16th), 1918. Nearly seventy persons, chiefly country ministers, were in attendance at the lectures and conferences which were given on economic, social and religious aspects of country life, and on agricultural topics by members of the staff of Macdonald College. The Summer School was a very successful one, not only in point of numbers but in directing and informing the country ministers of the problems of country life, and in deepening their sympathy with the farmer and his family.

The chief outside lecturers who took part in the Conferences were Prof. E. R. Groves of the New Hampshire State College, Dr. W. H. Wilson of Columbia University, and Rev. John McDougall, author of "Rural Life in Canada."

The second Summer School will be held in August (5th-14th) at Macdonald College when Prof. Phelan of the Massachusetts Agricultural College will give a course of ten lectures on Organization of Rural Affairs, Mr. E. C. Lindeman of the Chicago Y.M.C.A. will deal with Play and Recreation, and Canon Tucker of London will discuss special topics of pressing community interest. The college staff will also give lectures on phases of agricultural work.

The factors that have played a large part in arousing an interest in this new Rural Movement are, the writer believes, (1) the work of the Homemakers' Club under the late Mrs. N. C. Macfarlane, (2) the influence of Macdonald College through its various activities among the farmers, and (3) the example of certain clergymen and county demonstrators in showing the value of organization and leadership in building up a rural community where conditions are satisfactory, financially, socially and intellectually.

ONTARIO

BY W. BERT ROADHOUSE, DEPUTY MINISTER OF AGRICULTURE

THE rural community movement received an impetus, in the province of Ontario, with the passing of the bill and the voting of money for the establishment of community halls and athletic fields in rural districts. This measure, which was briefly reviewed in the June number of *The Agricultural Gazette*, was very cordially promoted by the Honourable Geo. S. Henry, the Minister of Agriculture, who considered it a proper movement to encourage. The movement, it is expected, will work in with various community activities. There is a strong indication of a desire on the part of the people in many sections of the province to erect community halls as memorials to those who have fallen in the war. While the bill was not designed to give assistance in the erection of memorials the regulations under the Act do not prevent the using of the grant in the construction of halls that will serve as memorials in addition to the regular purpose for which they are intended. It is anticipated that women's institutes, farmers' clubs, and other public spirited bodies will not be slow in taking advantage of the grants available. Following are the regulations passed under the Community Halls Act and approved by the Lieutenant Governor in Council:—

1. Where it is proposed to establish a community hall and athletic field under this Act the Municipal Council of the Township shall appoint a Board of Management in accordance with Section 6 of the Act, and such Board shall handle all matters pertaining to the construction of such hall and planning of such grounds, and shall be responsible for any moneys collected for these purposes.

2. The site shall be approved by the Minister, and plans and specifications for a community hall and athletic field shall be submitted to the Minister of Agriculture for approval before construction is commenced.

3. The size of the community hall shall be determined by the Board, but every hall shall provide the following accommodation:— assembly room with movable seats, stage, and other equipment; reading room including library; kitchenette.

4. Every hall erected under this Act shall be available for any public gathering of educational, fraternal, religious or social nature or for the discussion of any public question, and no organization shall be denied use of the building for religious, fraternal or political reasons.

5. The Board shall regulate and control the use of the hall and athletic field and shall have the care and management thereof, and, subject to the Act and these Regulations shall make such rules as are necessary for the proper conduct of each, and shall have power to fix such charges as are necessary for the purposes of proper maintenance, provided that any person or organization considering themselves aggrieved may have the right of appeal to the Minister of Agriculture.

6. Subject to the regulation of the Board as to hours and discipline, the reading room and library shall be open to all.

7. The Government grant as provided by the Act shall be paid to the Treasurer of the Township on certificate of such officer as may be designated by the Minister setting forth that the terms of the Act and these Regulations have been complied with.

8. The Government grant shall be payable only on the cost of such portion of the building as may be used for the purposes herein enumerated.

9. An athletic field must be provided with each community hall, to be adjacent thereto or within convenient distance, and to be at least three acres in extent, such athletic field to be vested in the Township and controlled in the same manner as the hall.

10. Every athletic field shall be available for picnics, sports, school fairs, public meetings and other community gatherings of any kind.

11. The Board appointed in accordance with this Act shall be responsible for the observance of the terms of the Act of these Regulations.

UNIVERSITY OF TORONTO

IN its department of social service the University of Toronto provides a course of lectures on rural conditions and problems. The course involved in this section is

in charge of Miss Yates. Following is an outline of the course available to the students attending the University to be given at its next session which commences on September 15:—

INTRODUCTION.

1. Definition.
Purpose and scope of course.
Complexity of the rural problem.
2. The rural family and the home.
Boys and girls' interests.
Homes and home surroundings, their importance as units of social organization.
3. Fundamental needs in a community from the standpoint of the individual home.
4. Discussion period. (Reports of farm social studies.) Land—the basis of society. The farm and family life.

THE RURAL SOCIAL STATUS.

5. Means of transportation and communication.
(a) For recreation and social life.
(b) Distance from a trading centre.
(c) Patronage of mail order houses and peddlers.
6. Recreation and the social life.
Social responsibility of the rural community.
Rural revels and shows.
7. Social aspects of rural labour.
Housing problems.
The immigrant in the community.
8. Discussion period. (Reports of village studies.) Imitation and city influence. The village and the rural social centre.

RURAL INSTITUTIONS, AGENCIES AND METHODS.

9. Educational conditions.
Rural extension as a socializing agency.
Vocational functions of the rural school.
Consolidation and efficiency.
10. Religious conditions.
The church and its allies.
11. Local government and the rural community.
Political conditions.
Leadership—resident and non-resident.
12. Discussion period. (Reports of township studies.) Public opinion and community pride. Local government and the township.

RURAL SOCIAL ORGANIZATION.

13. Rural health and sanitation.
Care of dependents, defectives and delinquents in their relationship to the rural community.

14. Organizations managed by government at public expense, provincial, federal and international departments of Agriculture. The county office of the agricultural representatives.

15 Economic conditions.

Rural credits and the co-operative movement, marketing and exchange, labour income.

16. Discussion period. (Reports of county studies.) Rural social pathology and the county. Moral problems.

RURAL SOCIAL SERVICE.

17. The peopling of the province of Ontario.
18. Provincial institutions giving instructions in social service.
19. The new rural awakening, and its needs.
20. Discussion period. (Reports of provincial studies.) Rural progress. The province of Ontario and its social links with the Dominion.

The course involves a study of institutions and groups or community life in the open country. An effort is made to cover what is known of the fundamentals of rural life and to take up some speculative discussions in addition.

Because of the need for a broad foundation upon which to interpret community organization whether rural or urban some details of the general fields of the social sciences are given. Students in addition are required to attend lectures on

1. Community work in general.
2. The municipality, its work and problems.
3. The social treatment of poverty.

Besides the instruction given in the regular courses of studies local lectures are offered to the public through the University Extension so that those not able to attend the University may avail themselves either of single lectures or short courses of lectures on questions relating to the rural community movement.

CARLETON COUNTY

W. D. JACKSON, B.S.A., AGRICULTURAL REPRESENTATIVE

THE question of establishing a community centre in this district began about two years ago when the local council discussed the erection of a memorial hall for

the boys who enlisted from Carleton county. It was decided at that time to lay the matter over until the termination of the war. Since the signing of the armistice the women's

institute have taken active steps in advancing the community hall idea. This body waited upon the municipal council and received the assurance of their support. While no further

definite steps have been taken, it is generally understood that a community hall will be built in the near future.

MIDDLESEX COUNTY

BY R. A. FINN, B.S.A., AGRICULTURAL REPRESENTATIVE

THE community centre movement has made a beginning at two points in Middlesex county. At Belmont, steps have been taken to secure a community building for which a considerable sum of money has been promised. At first it was planned to buy a hotel building and about one acre of land, but this scheme for the time being has fallen through.

In the more northern part of the

county, at Clandeboye, a community hall is already serving as a meeting place for farmers' clubs and other public gatherings. The hall was renovated last winter, and a covering of fibre board put on the walls and ceiling, chairs purchased for seating, and when sufficient funds are on hand a new floor will be put in. The improvements so far have been paid for from the proceeds from a box social held last winter.

ELGIN COUNTY

BY C. W. BUCHANAN, B.S.A., AGRICULTURAL REPRESENTATIVE

AT the town of Clachan, in the western part of Elgin county, a community hall was put up by a number of public-spirited men. It is given free for all local purposes.

Outside people who use the hall for entertainment and similar purposes, are charged a fee, the proceeds of which go to keeping up the building.

NORFOLK COUNTY

BY E. F. NEFF, B.S.A., AGRICULTURAL REPRESENTATIVE

THE community centre idea is receiving some consideration in this district, more especially in connection with the consolidation of schools. It is felt by the president of the women's institutes at Delhi and others, that the community life should centre around the consolidated school. Such a school should have every modern equipment, and a hall in conjunction, as well as a gymnasium, experimental plots,

play grounds, etc. This, it is felt, would have a far greater influence in developing a proper rural morale than to add to the school buildings a few additional rooms. A community hall would fill a long felt want in many communities but would also be more economical if built in connection with a consolidated school, especially in respect to heating, one heating outfit serving the two.

MANITOBA

BY FRED C. MIDDLETON, COMMUNITY SECRETARY

THE community movement of Manitoba is under the direction of the Social Service Council, which is a federation, non-

partisan in politics and religion, whose purposes are the study of social welfare ideas and the encouragement of all forms of social service.

There are twenty-four provincial bodies represented in this federation, including the various religious denominations, the Grain Growers' Association, Educational Association, Retail Merchants' Association, and Union of Municipalities.

The activities are grouped under five headings represented by the following standing committees:—1, Public Forum; 2, Better business;

3, Young people; 4, Public health; 5, Recreation. Detailed suggestions for these committees are outlined in the constitution of the Council. The movement is still somewhat of an experiment in Manitoba but the report covering the first ten months of our work shows that very good progress is being made. Clubs have been formed in more than twenty places and all are doing good work.

ALBERTA

THE QUEENSTOWN FARMERS' HALL

BY JOHN GLANBECK

THE Queenstown Farmers' Union with its membership in Milo, Queenstown, Majorville and Lake MacGregor, is a long way from towns and railways—in fact no nearer than it was fifteen years ago. However, this "splendid isolation" has done much to keep the settlers together.

The question of raising funds was solved by the organization of the Farmers' Co-operative Association. At a general meeting of shareholders it was decided that the Association should build a hall, hold the title to the land and building, and have control of it. A member donated two acres for a site. Shares, giving shareholders full membership rights under the co-operative association, were sold at \$50 each. After a vigorous campaign, in which sufficient shares were disposed of, tenders were called for and work was soon under way. Our hall is 36' by 72' with a basement all modern, and cost a little over \$6,000. The main hall contains a piano, and its full quota

of chairs. It has a good maple floor, a large stage, and in the rear a place for a moving picture machine, as well as a ticket office and cloak rooms. The basement, which is divided into two parts, contains a kitchen, dining-room, and pantry in the one part, while in the other is a furnace, coal bin, electric light plant and cistern. This hall is acknowledged to be one of the best in southern Alberta, and since its erection it has been used for every gathering in the district.

During the influenza epidemic last winter the hall proved its worth. On two occasions it was opened up as a hospital where a staff of nurses and doctors were able to care for patients who now owe their lives to the care they received at the community hall.

To sum up—the community hall is a valuable asset to any district. In fact it is a necessity. It provides a social centre and creates a neighbourliness among the people of the community. It helps keep the young folk on the farm and makes life just a little more worth living.

THE BLACKFOOT COMMUNITY HALL

BY T. P. TAYLOR

IN 1914 the need of a regular central meeting place was keenly felt. A member undertook to see every person in the township with a view to raising money to be

used for building a community hall. He was backed by both members and non-members to such an extent that within a few days a meeting was called to organize a building com-

mittee. Three men were chosen, and plans were outlined for the original hall to measure 26' by 46'. Farmers turned out with teams and wagons one day in January 1915 and hauled lumber from the yard seven miles away to the location chosen on the town site just surveyed. A few days later, with the mercury somewhere between 20 and 30 degrees below zero, work on the building was commenced. Four or five weeks later we were ready for the opening.

We have recently added an extension of 26', made up of two large

rooms 13' by 18', cloak room 5' by 8' and kitchen 5' by 8', and stage 11' by 16'. Between the two large rooms is a door 10½' wide which may be opened up to make one large room when necessary.

All our local meetings take place in this community hall, including municipal and political meetings and social affairs. Church service is held in it every two weeks. The attendance at all meetings is far better since we have had our own public meeting place and the social aspect of the community is greatly improved.

DE WINTON COMMUNITY HALL

BY MISS JEAN BREMNER

OUR community hall is the result of the efforts of the ladies of the district to secure a meeting place to replace the old hall which was converted into an implement shed. The owner of the old hall, very generously offered two lots on which to erect the new building. The offer was accepted and two young ladies canvassed the district with the result that over \$600 was promised when our first general meeting was held in April, 1918. At this meeting it was decided to go ahead with the building. Five trustees were appointed to negotiate with the merchants at Okotoks for a \$200 loan to supplement the money already subscribed. A building committee was selected and work was started. The hall, 40' by 60', is a frame

building on a concrete foundation. The work was done by a carpenter and helper, assisted by plenty of volunteer labour.

This hall is not a United Farmers' building, but a community hall put up by the people of the district for the use of the community. It was well under way before the farmers had organized, all material for the hall being on the ground when the United Farmers' Association held their organization meeting. It seems probable that the erection of this building had some share in influencing the organization of the farmers' local. It gave the farmers the "get together spirit" and has since then been a very convenient meeting place for them.

GARDEN PLAINS' FARMERS' HALL

BY R. W. MOORE

WE built our community farmers' hall about four years ago. It is approximately 40' by 26' and the money for its construction was raised by means of entertainments and dances held in the building after its completion. When financial obligations had to be met members of the local subscribed \$5

each to the treasury. Thus it was possible to meet the instalments on lumber and building material. These subscriptions were voluntarily loaned without interest and they were repaid after the hall was completed and several successful entertainments had been held.

GOVERNMENT ASSISTANCE TO FAIRS AND EXHIBITIONS

NOVA SCOTIA

BY DR M. CUMMING, B.A., B.S.A., SECRETARY FOR AGRICULTURE

THERE are held annually in the province of Nova Scotia, the provincial exhibition, from 10 to 18 county fall exhibitions, being approximately one exhibition for each county in the province; about the same number of seed fairs and approximately the same number of poultry exhibitions.

The provincial exhibition, the whole plant of which was destroyed in the Halifax explosion in December, 1917, and which consequently was not held last year and will not be held this year, was conducted by a joint commission, comprised of representatives of the city of Halifax, the Nova Scotia Farmers' Association and the provincial government. The cost of operating this exhibition was divided equally between the city of Halifax and the provincial government, the procedure being that these two bodies each annually paid 50 per cent of such deficit as might be incurred and planned to share a like percentage of any possible profits. Since the inception of this exhibition the procedure has been that of paying deficits.

In respect to county exhibitions, under the provisions of chapter 62, of the acts of 1913, the provincial government pays to each society, association, company or board conducting a county or district exhibition, provided it deems the extent and scope of such exhibition sufficient to warrant the same, a minimum grant of \$300 to be paid at the time such exhibition is held, and pays an amount over and above the said grant equal to 50 per cent of the prize money exceeding \$300 actually paid out, provided, however, that the total grant paid under these provisions shall not exceed \$500. The same act makes provisions for one or

more joining counties uniting in holding one central exhibition. When such united exhibition is held there may be granted to it the maximum grant which can be drawn in the county in which the exhibition is held and in addition the minimum grant which the other county or counties would be respectively entitled to draw. This means that such central county exhibition would be granted \$500 on account of the county in which the exhibition was held plus \$300 for each county uniting with such county.

In respect to seed fairs, of which it is usually planned to have approximately one for each county, grants are paid both by the provincial government and by the seed Branch of the federal Department of Agriculture. Under this scheme the provincial government pays from one-half to two-thirds of the prize money paid out, the percentage depending upon the actual amount paid, and the Seed Branch pays two-thirds of the prize money paid out, but in no case does the grant of the Seed Branch exceed \$50.

Up to the year 1917, the provincial seed fair was held at Truro, on account of which the Seed Branch of the federal Department of Agriculture paid two-thirds of the actual prize money paid out, not to exceed \$400, and the provincial government paid the balance. This seed fair has now been merged into the Maritime Province Seed Fair, grants for which are approximately on the same basis as in the foregoing.

In respect to poultry exhibitions which are held by poultry clubs throughout the province, the provincial government will pay two-thirds of the prize money paid out to poultry

shows held but the total grant for any one county for this purpose shall not exceed the sum of \$100.

Reference should also be made to the Maritime Winter Fair annually held at Amherst, support for which is granted by the federal government and by the governments of each of the three maritime provinces. The grant paid by the province of Nova Scotia is \$1,200 annually.

The provincial government pays all expenses of the judges in the purely agricultural departments of the county exhibitions, seed fairs, and poultry

club shows. The Live Stock Branch of the Federal Department of Agriculture has always assisted in supplying judges for the provincial exhibition.

One of the provisions under which the expenses of these judges are paid is that the provincial superintendents of county exhibitions, seed fairs and poultry shows must approve of the dates on which such exhibitions or shows are conducted. This gives the superintendent an opportunity to have dates arranged so that the judges may proceed from show to show on a continuous circuit.

NEW BRUNSWICK

BY M. A. MACLEOD, SUPERINTENDENT, AGRICULTURAL SOCIETIES

AS educational features and a stimulus to the production of high quality live-stock and other products of the farm, the New Brunswick Department of Agriculture encourages the holding of Interprovincial, Provincial, County and District Exhibitions and Fairs.

Fredericton and St. John alternately hold the Annual Interprovincial Exhibition. Chatham also holds an Interprovincial Exhibition. This year Woodstock is erecting an exhibition plant, the doors of which will be open to all Canada and the State of Maine.

The St. Stephen Exhibition, for the first time in its history, will this year be open to the whole Province of New Brunswick and Washington County, Maine.

A number of the counties hold County Exhibitions, usually under the auspices of some progressive Agricultural Society, within the county in which the Exhibition is held. A goodly number of Agricultural Societies hold District Fairs within the confines of their respective territories, at which entries are open only to the members of their respective Societies.

The live-stock judges are usually furnished for the Interprovincial and Provincial Exhibitions by the Live-stock Division, Ottawa, the respective

managements paying their expenses and about ten dollars per day for the time actually engaged while judging.

The judges of the other products are, as a rule, furnished by the Provincial Department of Agriculture, as well as the judges of all classes at County and District Fairs.

The Department of Agriculture frequently assists by special grants in the erection of exhibition plants. The Interprovincial and Provincial Exhibitions receive from the Department of Agriculture a definite grant. The grant for 1919 was as follows:--

Fredericton.....	\$5,000
Chatham.....	5,000
Woodstock.....	3,500
St. Stephen.....	2,000

County Exhibitions receive grants from the Department of Agriculture amount to seventy-five per cent of the total amount of monies actually paid as cash prizes.

District Fairs receive no grants but are allowed to use the funds of their respective managements, such as membership dues, donations and government subventions as prize monies.

The larger Exhibitions arrange to hold their Exhibition dates so as to form consecutive circuits. The smaller fairs submit their dates to the Department of Agriculture for approval.

QUEBEC

BY OSCAR LESSARD, SECRETARY, COUNCIL OF AGRICULTURE

IN the province of Quebec, the local fairs are held by the agricultural associations which number about 87. Every county may have its association, and even some counties, owing to the extent of their territory and the needs of their farmers, have two or three associations, independent from each other, and which are designated by the name Agricultural Association A, B or C of the county of These associations are an important factor in stimulating the agricultural class, and nearly sixty local fairs are held in these counties every year.

A county association receives from the Provincial Government a grant equivalent to twice the amount subscribed and paid for by the members. However, the maximum grant for a county association is fixed at \$800, and this grant, added to the members' fees, helps to defray the expenses incurred in the organization and the administration of each fair.

Under the law governing the agricultural associations and the regulations of the Council of Agriculture, no prizes can be offered for non-registered male animals of the bovine, porcine and ovine species.

It is also required that every list of prizes be divided into classes, and that such lists be submitted to the approval of the Council of Agriculture, sometime before the fair takes

place. Generally the judges for these fairs are selected by the association and paid by them; however, the Government also sends occasionally, free of any charge, competent persons able to judge the animals and who give useful counsel and advice in the interests of the members, and of future fairs.

By mutual agreement, the associations arrange, as much as possible, so that the fairs that are held in one district do not take place the same day, so that the same people may attend several fairs and compare the advantages that each of those may offer.

We may also say that each fair includes distinct sections for horses, cattle, cereals, fruit culture, poultry keeping, horticulture, bee-keeping, etc. The agricultural class takes a great interest in such fairs. There is also a large number of exhibitions and the results obtained are certainly beneficial and greatly appreciated by all those who take an active part in agriculture and who work conscientiously for the interests of this industry in our province.

In addition to their regular income, a large rather number of associations receive special grants for their fairs. The total amount expended by the associations on the organization and the conduct of these fairs, exceeds yearly the sum of \$90,000.

ONTARIO

BY J. LOCKIE WILSON, SUPERINTENDENT OF AGRICULTURAL SOCIETIES

IN the province of Ontario the following are the grants to agricultural societies for fairs and exhibitions: pure seed fairs \$500. A society receives a grant equal to half its expenditure for agricultural purposes, with a maximum of \$25. Spring stock shows \$3,500. For these shows the grant is based the same as above, but the maximum is \$50.

The main grants for agricultural

societies are \$85,000 and of this amount a sum of about \$3,000 is appropriated for societies, which keep pure bred stock and hold no fairs. The balance, after providing for new societies, which get a grant of one dollar per member up to \$300 for the first three years, is divided among the societies holding fall fairs on the basis of their average expenditure for strictly agricultural purposes for

the three preceding years, the maximum being \$800. The unit for 1919 was 33 cents on the dollar. Expenditure for agricultural purposes includes the following:—prize money for fall fairs, field crop competitions (the society's contribution only), plowing matches, lectures and meetings for the discussion of agricultural subjects, agricultural periodicals, purchase of seed and plants for free distribution to members, expenses of delegates to the fairs and exhibitions' convention and amounts paid or departmental judges. Except for new and stock societies membership is not considered in apportioning grants.

The pioneer societies in Northern Ontario receive special consideration and their grants are based on double their expenditure for agricultural purposes, and in addition to this, they are given a special grant of \$5,000, apportioned in a similar manner to the main grants. Societies on Indian reserves receive their grants out of a special fund of \$1,000. A sum of \$5,000 is set aside for the Canadian National, Central Canada, and Western fairs, the maximum to any one of them being \$2,500.

In order to assist societies, which have wet weather conditions on the

dates of their fairs, or suffer loss of buildings by fire within thirty days previous to the holding of their exhibition there is an appropriation of ten thousand dollars, the basis of distribution being 75 per cent of the loss in gate receipts as compared with the average gate receipts of three previous normal years. The maximum to a society is \$300.

Judges are supplied to societies which apply for them for \$6 a day when on a regular circuit and for \$8 for special judges. The revenue received by the government from this source in 1918 was over \$5,000.

As regards the dates of fairs this is left to the individual societies in most cases, but a number of them, particularly in western and central Ontario have local organizations and hold meetings each year where delegates arrange dates that avoid clashing.

The membership of the 350 agricultural societies in Ontario, apart from the larger exhibitions, was, in 1918, \$250,000. The societies have been making rapid strides in recent years. Improvement is seen on every hand, particularly in the exhibits of live stock, farm products and domestic science.

MANITOBA

FOR the summer and fall fairs the Department of Agriculture provides a grant equal to 60 per cent of the amount actually paid out in cash prizes on all agricultural home economics or school exhibits. The grant is based on the payments made in connection with the fair held during the previous year.

A membership grant of one dollar for each paid-up member, up to a maximum of 200, is also paid, provided the society has taken part in two other lines of specified work, and on each of these 60 per cent of the amount paid out for cash prizes is allowed.

JUDGES

In order that judges can be provided at a minimum of expense, the fair dates are set at the annual convention of agricultural societies in February. The fairs are arranged in circuits, and the Agricultural Extension Service arranges for as many judges as are required. The Department of Agriculture pays all railroad expenses and for the judge's time in getting from place to place. The agricultural society provides hotel accommodation and pays the judge \$6 a day for the day he is actually judging. This means that

the cost of judging is borne equally by the societies and the Department of Agriculture.

SETTING FAIR DATES

In order that a judge may do a maximum amount of work at a minimum outlay of time and expense, the dates are arranged by the Agricultural Extension Service; but in setting these dates, agricultural society secretaries are always consulted. The fair dates are set at the time of the annual convention of agricul-

tural societies and changes may not be made in dates without consulting the Director of the Extension Service, as, otherwise, fairs might be held on the same date by adjoining societies to the great disadvantage of both.

Societies not represented at the annual convention must either accept the date which, in the opinion of the director, will not interfere with any other society. Where societies decide on their own dates, the Extension Service is not under obligation to provide judges.

SASKATCHEWAN

BY S. E. GREENWAY, DIRECTOR, EXTENSION DEPARTMENT

THE grants paid to fairs and exhibitions in Saskatchewan, and the conditions governing the same are authorized under section 37 of the Agricultural Societies' Act which reads as follows:--

"Out of the moneys appropriated by the legislature for the purpose, and subject to the conditions hereinafter set forth and to such further conditions as may be imposed by the Lieutenant Governor in Council, there shall be payable in aid of agricultural societies the following grants:

(a) to each society whose membership for the last preceding financial year is shown to have included at least one hundred members but not more than one hundred and fifty who have paid their dues up to the date of their annual meeting, the sum of twenty-five cents for each member, and to each society whose membership for the last preceding financial year is shown to have exceeded one hundred and fifty members who have paid their annual dues up to the date of their annual meeting, the sum of fifty cents for each member, but no society shall receive a greater sum than \$100 therefor for any one year.

(b) to each society fifty per centum of the cash prizes paid in connection with exhibitions of live stock and agricultural products, spring stallion shows, live stock judging competitions, live and dressed poultry shows, good farming competitions, competitions in standing crops, summer fallow competitions, seed fairs and other competitions which may be approved by the Lieutenant Governor in Council;

(c) provided that the total amount of

prizes paid for exhibits of pure bred dogs of utility breeds at agricultural exhibitions shall be payable as a grant, but no society shall receive a greater sum than \$25 therefor in any one year.

* * * * *

(3) The total amount of grants payable to any agricultural society or exhibition association located in a city or town having a population of not less than 3,000 as determined by the latest Dominion census, shall not exceed in any one year the sum of \$2,000, and the total amount of grants payable to any other society in any year exclusive of any grant which may be earned by virtue of sub-section (5) of section 9 of this Act shall not exceed the sum of \$750.

(NOTE.—Subsection 5 of section 9 referred to in the foregoing paragraph authorizes the payment of grants of one half the amount collected by the societies in life memberships, the value of such memberships being \$15.)

Judges for the exhibitions and other competitions are provided by the Agricultural Extension department of the University of Saskatchewan. Salaries and expenses of these judges while engaged in the work are paid by the department. The per diem allowance at the present time is \$8 for week days with sustenance allowance of \$3 for Sundays.

With regard to the dates the wishes of the societies are regarded as fully as possible with a certain amount of latitude being left with the director in order that dates may be arranged in circuits for the purpose of economy and efficiency.

ALBERTA

BY ALEX. GALBRAITH, SUPERINTENDENT OF FAIRS AND INSTITUTES

THE Department of Agriculture of Alberta pays two-thirds of all the prize money paid out by agricultural societies at their annual fairs for live stock, agricultural and domestic products. They also pay dollar for dollar to each society on its membership up to one hundred and fifty, no society being recognized with a membership of less than fifty.

The Department also provides judges for live stock, paying travelling expenses and remuneration for the judges' time, the only expense the agricultural societies are at being the local hotel bills while the fair is on.

With reference to dates, these are

all fixed at the annual meeting of the Alberta Fairs Association, held usually in February at Edmonton and Calgary alternately. Delegates from all the agricultural societies and exhibition associations are present and no difficulty has been experienced hitherto in fixing dates satisfactory to those delegates.

This year the fairs of the province which commenced on June 25th and will end early in October are divided into fifteen circuits, each circuit including from one to fifteen fairs. Most of the circuits contain from seven to ten fairs and are so arranged as to meet the convenience of the judges.

BRITISH COLUMBIA

BY DAVID WARNOCK, M.R.C.V.S., DEPUTY MINISTER

AT the last session of the Legislature the sum of \$35,000 was appropriated for grants to Agricultural Fairs and payment of judges expenses.

1. GRANTS PAID TO FAIRS AND EXHIBITIONS AND CONDITIONS GOVERNING

Audited statements showing all receipts and expenditure must be rendered annually to this Department.

Prize money and expenses: Hitherto the allotment of grants has been arbitrary, but in future it is proposed to apportion on a basis of 50 per cent of the prize money paid by the Fair Association.

2. PROVIDING JUDGES AND JUDGES' EXPENSES

On request judges are provided and expenses paid by the Department. In some cases directors prefer to select their own judges and pay expenses.

3. POLICY AND METHOD RESPECTING ARRANGEMENT OF DATES

As far as is practicable, fairs and exhibitions are arranged in circuits for convenience of exhibitors and judges, and there are five circuits outlined this summer. Some associations submit dates for the approval of the Department, while others ask the Department to allot dates; but in all cases the Department exercises supervision with a view to obviating conflict.

REMOVAL OF MALES FROM THE POULTRY FLOCK

NOVA SCOTIA

BY J. P. LANDRY, MANAGER AND LECTURER, AGRICULTURAL COLLEGE

WHILE we are aware that serious losses occur through permitting male birds to run with the flock after the breeding season, we have no accurate information as to the extent of the losses thus occasioned. Each year, at the end of the breeding season, we issue articles to

the newspapers of the province calling particular attention to the advantage of removing the male birds from the pens after the hatching eggs have been secured. We have taken no action beyond this to encourage the removal of the males.

NEW BRUNSWICK

BY A. C. MCCULLOCH, POULTRY SUPERINTENDENT

THIS department has not taken up the question of removing the male birds from the flock as one of its big issues. During the summer of 1918 it seemed to me quite evident that the people in this province were disposing of their male birds much more readily and earlier in the season than I have known them to do in any other place where I have been doing poultry work. The reason given in most cases was the high price of feed, and not the knowledge of the male birds being a factor in the loss of eggs through

incubation. It was rather an exception to find an adult male bird on the farms during the summer.

Regarding the loss due to fertile eggs, I believe it is considerable throughout the entire Dominion in spite of the fact that an effort has been made during the last few years to reduce it to a minimum. Articles bearing on this point have been sent to the agricultural papers and any newspapers in this province that wish to publish them. No doubt this has has some influence on reducing the loss of eggs.

QUEBEC

BY A. G. TAYLOR, EXTENSION POULTRY HUSBANDMAN

THE presence of male birds in the poultry flocks after the breeding season is over costs the farmers in the Province of Quebec large sums of money each year. Every encouragement is given the farmers to sell these birds after May 15th. Lengthy articles are sent to the daily and weekly papers pointing out the advantages to be derived from the sale of these birds and the disadvantages to the poultry industry in the event of them being

allowed to remain with the hens. As cockerels give higher fertility than cock birds there is no object in the farmer keeping the male birds from one season to another. In the event of a male bird being of extra good breeding he can very easily be given a small enclosure by himself. Ninety-five per cent of the male birds on the farms at the present time would be better dead than alive.

SASKATCHEWAN

BY R. K. BAKER, B.A., PROFESSOR OF POULTRY HUSBANDRY

A campaign for the removal of male birds from the flocks of Saskatchewan was carried on by the Department of Agriculture. June 9th was the day set aside and poultry raisers were encouraged to live up to the suggestions of the poultry department of the University of Saskatchewan. A poster issued by the Department states that each summer Saskatchewan farmers lose one and half million dollars through shipping fertile eggs. This loss can be avoided by marketing only non-fertile eggs. In the fertile egg the embryo chick develops at a temperature of 70 per cent or over. A few hours exposure in a warm room or in the bright sunlight spoils its keeping qualities. A chill following a few days warmth makes the fertile egg a total loss. This loss in Saskatchewan amounts to 36,000,000 eggs annually. The remedy suggested

advocates the removal of every male bird from the flock as soon as sufficient fertile eggs for hatching purposes have been secured. Arrangements were made for local merchants throughout Saskatchewan to receive and ship the birds thus culled out from the flock, and highest market prices were paid by dealers and buyers for these roosters. Not only did the removal of these birds mean a saving of eggs and a good market price for the fowl but on all roosters sold early in the season, \$2 worth of feed was saved during the rest of the year.

This practice of removing the male birds early in the season is also a step in the improvement of the flock. New birds can be secured in the fall which will mean a change in the blood and an assurance of vigorous young birds for the next spring.

ALBERTA

BY A. W. FOLEY, POULTRY SUPERINTENDENT

FOR the past ten years the poultry branch of the Alberta Department of Agriculture has been carrying on educational work with a view to encouraging the removal of male birds from the laying flock after the breeding season. This matter is constantly kept before the poultry raisers of the province

and particularly those who market eggs. Our poultry literature gives prominence to this matter. As a result of this educational work the poultry raisers in this province, more especially those who make a specialty of marketing eggs allow their male birds with the flocks only during the breeding season.

NOVA SCOTIA

AN INFESTATION OF APPLE SUCKER, *PSYLLIA MALI*, SCHMIDB. IN NOVA SCOTIA

BY W. H. BRITTAIN, PROVINCIAL ENTOMOLOGIST FOR NOVA SCOTIA

THE discovery of a severe infestation of the apple sucker (*Psyllia mali* Schmidb.), so well known in many European countries, at Wolfville, N.S. marks the advent of another undesirable immigrant to the North American continent. The centre of the infestation seems to be in a few adjoining orchards a short distance west of the town of Wolfville. Radiating from this point it gradually

disappears. A single nymph was found about a mile west of this centre at Greenwich, and another between two and three miles north of this spot near Starr's Point. The present distribution is, therefore, as far as we have been able to determine it, a comparatively restricted one. Since the discovery was made only a very short time before the adult stage was reached, the exact distribution cannot

be stated with certainty at this time, the presence of adults being naturally much harder to detect than that of the nymphs, especially in cases where the infestation is light.

MANNER OF DISCOVERY

A fruit grower in the infested area, while cultivating his orchard, noticed that his clothing and the backs of his horses became covered by a clear sticky liquid (honey dew) which dripped from the trees. On further examination this appeared to proceed from a small green insect with which the leaves, twigs and fruit spurs were covered, which he took to be the green apple aphid (*Aphis pomi* DeG.). To remove the material from the animals, a liberal use of soap, water and a brush was necessary. This fact he mentioned to one of the entomological inspectors, Mr. J. P. Spittall, who secured specimens for the writer. A number of other cases were located in a similar manner to the first, since, wherever the insect was plentiful, the copious amount of honey dew excreted by the insect was very noticeable. The determination of the insect as *Psyllia mali* was subsequently confirmed by Mr. F. Laing of the British Museum, from specimens forwarded through the kindness of Dr. C. Gordon Hewitt, Dominion Entomologist, to Dr. Guy A. K. Marshall, Director of the Imperial Bureau of Entomology, London, and by Prof. F. T. Theobald, from specimens sent by the writer.

PROBABLE DURATION OF INFESTATION

It is a notable fact that this outbreak should take place so suddenly and in such great severity in a district where its presence was never before noticed, neither by the owners of the orchards nor by any member of the provincial inspection staff working in that district. During the summers of 1912, 1913 and 1914, all this territory was carefully covered by provincial inspectors during the San Jose Scale survey, and if this insect had been present in destructive numbers, it could hardly have failed to attract

their notice. Subsequent to that date, the Department has been conducting extensive spraying and dusting experiments in the vicinity of Wolfville, and an outbreak of this kind would certainly have been observed or reported, had such occurred. We are, therefore, safe in saying that this is the first destructive outbreak that has taken place in Nova Scotia, as well as the first record of the occurrence of this insect in North America. It goes without saying, however, that before the infestation could reach such proportions, the insect must have been present for some time.

THE INSECT

To any one with any knowledge of insect classification, the nymph of the apple sucker is easily recognized as a Chermid (*Psyllid*). It is light green in colour after the second moult, and larger than corresponding stages of *Psyllia pyricola* which have been described by Mr. W. A. Ross. The newly hatched insects are said to be dirty yellow in colour, with darker markings. The peculiar flattened form of the nymphs with rounded caudal margin and, in the later stages, the well developed wing pads give them a most peculiar appearance, resembling, as one farmer expressed it, a "spread chicken."

The following description of the fifth nymphal instar was prepared from specimens collected at Wolfville:

Fifth instar nymph. Body, short and broad; flattened. Head, short and broad. Eyes, prominent. Thorax, short; wing pads extending over the abdomen about one-quarter of its length, the lateral margins bearing a few very short hairs and a couple of longer ones at the distal extremities of the second pair. Abdomen, broadly rounded; flattened; fringed with sixteen long, stout hairs, interspersed with a few shorter ones all regularly placed. Legs, very stout and short, the lateral margins bearing a few shorter hairs. Colour.—Entire body pale yellowish green, the head being less yellow, while the extreme end of the abdomen is decidedly more so. Eyes, green. Antennæ, first segments green, becoming more yellow, turning gradually into a pale brown, the tips being black. Wing pads, green at the base,

gradually becoming lighter, until the distal half is of a pale, dirty, yellow, the outside margins being tinged with grey. Legs, femur green, tibia, pale yellowish brown, tarsi, pale brown, tips almost black. Length of body, 1.75 mm.-2.16 mm. Width at widest part, wing pads spread, 1.25 mm.-1.37 mm. Width of head including eyes, .594 mm.-.675 mm. Antennae .875 mm.-.926 mm. Hind tibia .350 mm.-.370 mm.

The adults like other members of this family resemble miniature Cicadas. In colour our specimens are yellow or greenish yellow, but the colour is said to be variable according to sex and age, other colours—reds, greens, browns, etc., becoming evident as the season advances.

The following description of the adult was also prepared from our Wolfville specimens, and it is hoped that this together with the accompanying drawings, prepared by Mr. W. E. Whitehead, will enable any one to determine the insect accurately:

Adult. Head, with vertex less than half as long as broad, emarginate at front at median line with cephalic ocellus in emargination. Genal cones moderately long, uniform, slightly shorter than vertex, not strongly divergent, rounded at tip, pubescent. *Antennae*, long and slender, slightly over twice as long as width of head. *Thorax*, moderately arched. Basal portion of hind tibia wanting. Pterostigma long and relatively broad; venation typical.

Colour. The general colour is pale green, sometimes tinged with yellowish, the females in our specimens appearing to be rather more deeply coloured than the males. Venter slightly lighter in colour than dorsum. Eyes pale green changing to yellowish and finally to reddish or reddish brown. Ocelli yellow. Antennae with basal portion greenish yellow growing darker towards tip, which is black or nearly so. Beak tipped with black. Dorsum of pronotum chrome yellow. Wings, transparent, iridescent, veins of first pair yellowish green. Femora of prothoracic and sometimes mesothoracic legs yellowish, of the metathorax and sometimes mesothorax very pale green; tarsi colourless or pale yellow; tibial and tarsal spines and claws jet black.

Total length of body, to tip of folded wing, 3.105 mm.-3.213 mm.; length to tip of abdomen, female, 2.56 mm.-3.25 mm., male, 2.7 mm.-3.078 mm. Length of forewing, 2.7 mm.-3.05 mm., of head including eyes, .594 mm.-.702 mm., of hind tibia .594 mm.-.675 mm.

Genitalia: Male.—Anal valve long, broad, not tapering; forceps long, the cephalic broad

at base, tapering to bluntly rounded distal extremity, the caudal narrow, converging at distal portion in acute black point. *Female*.—Genital segment fairly long, more than half as long as the rest of the abdomen, dorsal valve longer than ventral, both acute.

NATURE AND EXTENT OF INJURY

At the time when the discovery was made, the orchard at the centre of the infestation presented a sorry spectacle, resembling in appearance a pear orchard suffering from *Psylla pyricola*. The leaves were turning brownish and the whole tree had a sickly, wilted appearance. *Psylla* nymphs were present in untold numbers on the leaves, particularly at the axils, but were even more plentiful on the fruit clusters. Here, in most cases, the blossoms had entirely failed to develop, and had dried up and dropped; much fruit that did set soon shrivelled up and dropped to the ground. Leaves and blossom clusters were sticky with honey dew, which dripped from the trees upon man or beast passing through the orchard. In an infested orchard on a bright day, even the casual observer could not fail to see how every breath of wind would fill the air with tiny droplets of this material. In general it may be said that the injury is of a similar nature to that caused by the pear psylla to pear trees. Of all the varieties in the infested orchards, the Gravensteins seemed to suffer worst.

The really serious damage is done by the nymphs, that accomplished by the adults being scarcely noticeable in comparison. Within a fortnight of the disappearance of the nymphs a decided improvement was noticeable in the appearance of the infested trees. Large numbers of the injured leaves had dropped and new ones were being rapidly put forth. In the course of a month there was little to indicate the experience through which the infested orchards had passed except the presence of the adult insects on the leaves and the light crop of fruit. In some of the orchards, where at one time it appeared that the entire crop would be

ruined, a very fair showing of apples was in evidence. It should be noted in this connection that there was a very heavy fruit bloom this season, followed by a crop much larger than the average. With only a moderate bloom, it seems entirely probable that in the badly infested orchards the crop would have been almost if not entirely destroyed.

CONTROL

In Europe various washes and emulsions of carbolic acid, kerosene, caustic alkali, lime, etc., such as were much in vogue in this country until displaced by standard nicotine preparations, have been used. In Russia even open-air fumigation with tobacco waste and straw has been attempted, though apparently not with entire success. Theobald and Gordon Hewitt report late lime spraying to be very effective.

While the economical control of the pest under our conditions can only be determined by experiment, nevertheless, if the life-history has been correctly stated, it would seem that a single application of nicotine sulphate applied to the opening buds as for *Aphis pomi* or *Aphis malifoliae*, should be entirely effective and would have the added advantage of destroying these insects as well. If a second application were necessary, one applied just before the blossoms opened, would also destroy the green apple bug (*Lygus communis* var. *novascotiensis* Knight) which is often present in the same orchard.

At the time of discovery it was too late for us to attempt control work with a view to saving the crop, since by that time the major part of the damage done was already an accomplished fact. Immediate preliminary tests were, however, carried on as a guide to future work. It should be noted that at this time, i.e. June 12th, the leaves had attained practically their full size, making it difficult to spray effectually for sucking insects. On a portion of the orchard, nicotine

water was used, a heavy, drenching application applied by means of a "Friend" spray gun being given. In spite of the unfavourable conditions, almost perfect results were secured.

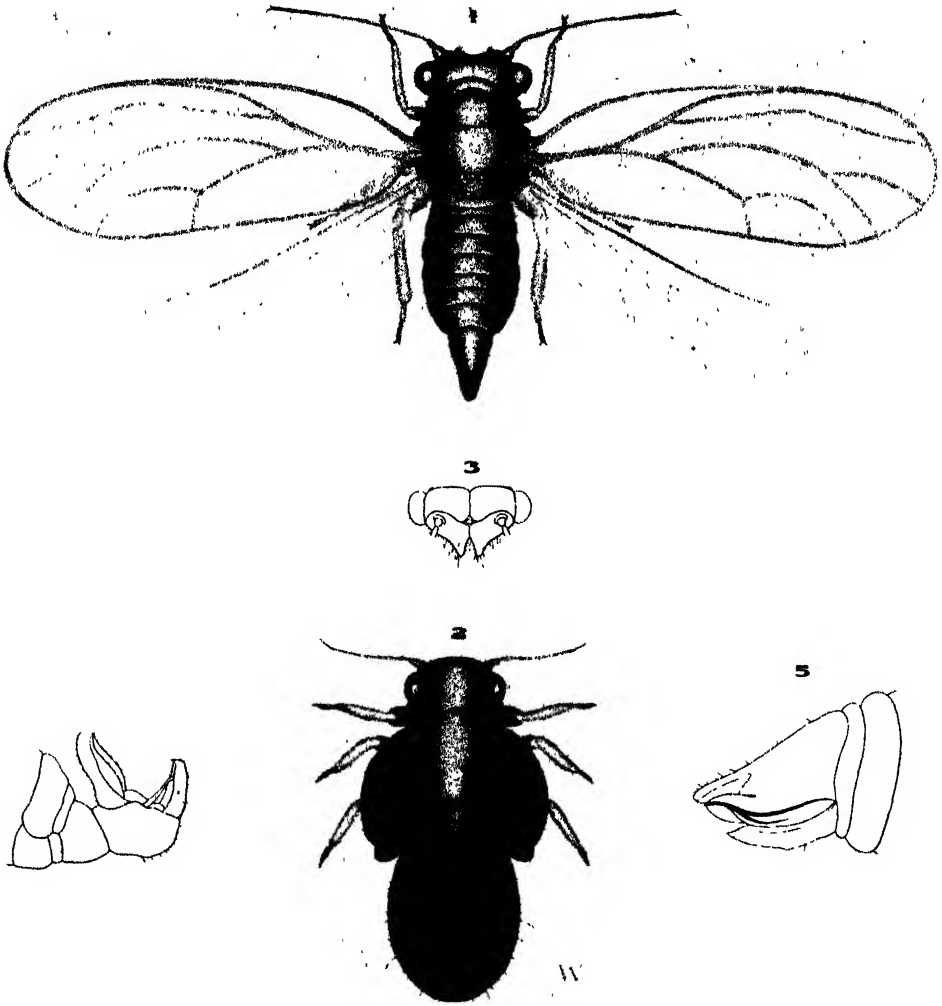
A number of contact dusts, prepared at our laboratories at Truro, were also tested for comparison with the liquid spray, the application being made by means of a "Johnson" orchard duster, manufactured by the Dust Sprayer Manufacturing Co., Kansas City, Mo. Nicotine sulphate was the basis of three of these dusts, this material being mixed, dried and ground with kaolin, yellow clay and sulphur respectively, at the rate of two pounds to the hundred. The formula for the first of these was obtained through the kindness of Prof. Ralph S. Smith of the University of California, who has used it extensively in the walnut groves of that State. Free nicotine solution combined with sulphur, using the same percentage of nicotine as the foregoing was another insecticide tested. In addition to the aforementioned we used a mixture composed of 50 per cent of finely ground tobacco dust, ground together with 25 per cent of dry lime sulphur (Sherwin-Williams) and 25 per cent hydrated lime.

None of the dust mixtures gave results comparable to the liquid spray, owing to the mechanical impossibility of driving the dust into all the hiding places of the insect, on account of the large size of the leaves at this time. All of them, however, seemed to destroy the insects whenever they came in contact with them. The yellow clay-nicotine sulphate combination seemed to be most effective, probably because we succeeded in grinding the material more finely with the apparatus at our disposal. The sulphur-free nicotine preparation was only slightly less effective. Too much, however, should not be made of these experiments, as the stage of development of the insects and the development of the trees made definite conclusions

impossible. They were valuable in indicating, however, that the susceptibility of this insect to treatment is much greater than that of the green apple bug, which at this time, was practically unharmed by any of the treatments given. In the light of our present knowledge, therefore, the prospects for spring treatment in

conrection with Psyllid control, would appear to be promising, though the possibility of fall spraying should not be overlooked.

The writer is much indebted to Mr. W. E. Whitehead for preparing the drawings which accompany this paper and for assistance with the description of the insect.



EXPLANATION OF PLATE

- Figure 1—*Psyllia mali*, adult female x 20.
 " 2— " " fifth stage nymph x 20.
 " 3— " " head, front view x 20.
 " 4— " " male genitalia x 33½.
 " 5— " " female " x 33½.

FIRST ANNUAL EGG LAYING CONTEST

THE first Nova Scotia annual egg laying contest will commence November 1st, 1919, at the Poultry Department of the Agricultural College at Truro, N.S., and will continue for eleven months, until September 30th, 1920. The board of management, under whose direction the competition will be conducted, will be the superintendent of poultry for Nova Scotia, the manager of the poultry department of the Agricultural College, and the superintendent for the contest (yet to be appointed), together with Mr. H. H. Hull, Glace Bay, president of the Nova Scotia Poultry Association; Mr. W. W. Osborne, New Glasgow, and Mr. John McMullen, Truro, N.S.

The addition to the poultry plant at the college to accommodate this contest was provided for by the appropriation of \$2,500 charged to capital account and passed at the last session of the Nova Scotia legislature. Provision is made for a contest of thirty pens of five hens or pullets and will be open to the province of Nova Scotia. The first thirty *bona fide* applications received, accompanied by the entry fee, will be accepted, and these contestants will be privileged to maintain a full complement of five birds during the whole period. No males will be included and no reserved birds will be required or accepted. The owner, therefore, is requested to have in readiness reserve birds which can be shipped upon notification in the event of the loss of any bird.

Applications are to be made on the printed form supplied and a \$5.00 entry fee for each pen must accompany the application. All entry fees will be used for prizes in this competition and suitable awards will be made to the winning pens.

The birds must be delivered at Truro, express prepaid, between October 1st and 15th and should be addressed Laying Contest, Poultry Department, Agricultural College,

Truro. Any birds arriving in a sick condition may be rejected and either destroyed or returned to the owner at his expense. None but pure bred birds will be accepted and only those breeds that lay a marketable size egg will be permitted to enter the contest. Rejection will be made at the discretion of the contest superintendent who will also have the right to clip the wings of any birds that may prove troublesome. No person connected with the Agricultural College or the Department will be eligible to make entries. The right is reserved to refuse any and all entries.

The rating of the birds or pens will be determined by the number, size, uniformity, and marketing value of the eggs, and the Canadian standards for eggs will be used in rating their value. The cost of production will also be considered in rating the standing of the pens. All eggs produced will be retained by the manager and sold to help defray the expenses of this competition.

While in this contest the birds will receive the best of feed and care, subject to the judgment of the board of control. Each contestant will be entitled to a record of each bird he has in the contest and to a statement showing the receipts for eggs, and expenditure for feed for his pen during the eleven months. Any birds in the contest which can qualify for the Canadian Poultry Record of Performance will be provided with pens to complete the twelve months' test required. No person, except officials of the contest, will be allowed in the pens or yards after the birds have been housed. Interference will not be permitted and every effort will be made to keep the birds quiet. All pens will be trap-nested during the contest and at the conclusion a detailed printed record will be presented to the contestants. Weekly reports will be sent each contestant and complete monthly records will be prepared for the press.

AGRICULTURAL ACTIVITIES

BY J. G. ARCHIBALD, B.S.A., ASSISTANT CHEMIST, TRURO.

RURAL SCIENCE SCHOOL

THE Rural Science School which is carried on jointly by the Agricultural College and the Provincial Normal College, closed its annual five weeks session on Aug. 6th. The attendance this year numbered 107.

EGG LAYING CONTEST

Arrangements have been completed for conducting the first annual egg laying contest ever carried on in Nova Scotia. The contest is to be held at the Poultry Department of the Agricultural College at Truro, will be open to the province of Nova Scotia, and will last for eleven months, commencing on Nov. 1, 1919. It is planned to accommodate thirty pens. Buildings for the housing of the fowls are now in course of construction, and entries are being received. The work is under the direct supervision of Mr. J. P. Landry, Superintendent of Poultry for the province.

TRURO AGRICULTURAL COLLEGE
OPENING

The next session at the Agricultural College opens on November 4th. This is a somewhat later date than the opening of O.A.C. and Macdonald College, but owing to the much later date of harvesting here, the students are needed at home much longer, hence it has been found impractical to open earlier. An attempt was made a few years ago to open the middle of October, with the result that at least 50 per cent of the boys had to drop into classes two or three weeks late. It is as yet too soon to forecast the attendance for the coming session, but at date of writing, Dr. Cumming reports rather more than the usual number of applications.

EXPERIMENTS WITH PASTURE
FERTILIZERS

Dr. J. H. Grisdale, Deputy Minister of Agriculture, visited the Agricultural College on August 4th and took particular interest in the numerous

instructive fertilizer experiments being carried on, especially in an experiment of some six years duration, improving native pasture land by top-dressing in the fall with basic slag and wood ashes. The pasture in question is sixty acres in extent and this season is carrying thirty-seven head of stock, and could carry a considerable number more, so great has been the improvement.

This is a most important line of work in Eastern Canada. Moisture conditions are so favourable here for good pastures, that the aim should be to maintain fertility. Unfortunately, most of our farmers take no care whatsoever of their pasture lands, so different from the practice in Great Britain, and as a result we do not get the returns that we otherwise might from this cheapest available source of food.

In the 1918 report of the Secretary for Agriculture for Nova Scotia, Professor Trueman reviews in detail the results from this work. Any one interested is referred to this report. Further results will be published this year.

ORCHARD SPRAYING EXPERIMENTS

Professor W. H. Brittain of the Agricultural College, and Mr. G. E. Sanders, of the Dominion Entomological Laboratory at Annapolis Royal, N.S., are carrying on some rather interesting experiments in orchard spraying.

A spray calendar issued by them this year differs quite markedly in its recommendations from any heretofore issued. The notable variations from what were formerly considered standard methods of combatting insect and fungus are:

1. The use, instead of lime sulphur, of a Bordeaux mixture containing a large excess of lime (formula 2-10-40).

2. The use of arsenate of lime instead of arsenate of lead. Orchardmen are cautioned never to use arsenate of lime alone on apple foliage.

3. The use of soluble sulphur (sodium polysulphide) for the third spray, along with arsenate of lime and five pounds of hydrated lime to forty gallons of water.

The excess of lime here is to prevent burning by the lime arsenate. It is obvious that in all the other sprays, a strongly alkaline Bordeaux being used, the addition of the

hydrated lime is not necessary.

Results so far, from these combinations, show a marked decrease in russetting of fruit and burning of leaves as compared with the old 4-4-40 Bordeaux, and they have a higher fungicidal value than lime sulphur. The main argument in favour of arsenate of lime is, of course, the item of cost.

ONTARIO

AGRICULTURAL REPRESENTATIVES' CONFERENCE

THE Ontario agricultural representatives met for their annual conference at the Ontario Agricultural College, Guelph, July 14th to 18th, inclusive. The programme covered a wide field and was carried out in detail. Mr. C. F. Bailey, agricultural commissioner and Mr. R. S. Duncan, supervisor of representatives, had charge of the conference throughout. Addresses were given on many pertinent agricultural topics and discussions brought out were keen and interesting. Demonstrations in judging grains, roots, vegetables as well as live stock and poultry were held in the various buildings at the college, with a view to establishing greater uniformity in the methods employed by the various representatives. Co-operation, one of the large questions, was thoroughly dealt with by various officials of the Department of Agriculture, as well as by managers of

co-operative associations who were present to outline their methods and make suggestions for the benefit of the representatives. Live stock improvement was outlined very clearly; horse breeders' clubs, the scrub bull campaign, live stock improvement associations in old Ontario, live stock mock auction sales, and boys' and girls' clubs' work with live stock were taken up by leading officials of the provincial and federal departments of agriculture and discussed by the representatives.

From addresses, reports and discussions it was quite evident that agriculture in Ontario has a great variety of problems to be solved and a conference of this sort is of paramount importance in enabling the representatives to compare methods and policies and receive suggestions which will enable them to carry on their work in their respective counties.

AGRICULTURAL REPRESENTATIVE NOTES

A NUMBER of auto excursions have been organized by agricultural representatives in several counties of Ontario. Farmers have taken advantage of these trips and have made visits not only to neighbouring counties but to several of the states across the line. In each case the agricultural representatives have arranged their pro-

gramme so as to make possible visits to the leading farms of each locality and also to agricultural colleges and demonstration farms. The Junior Farmers especially are taking an active part in these excursions and by this means are broadening their knowledge of agricultural conditions in their own county and other parts as well.

FARMERS' CLUBS UNITE

Representatives from four farmers' clubs in Simcoe county have arranged a union of their clubs for the purpose of live stock shipping and for a better handling of their general business. This move, they believe, will have a tendency to solidify their business.

TEACHERS' OUTING

An outing and motor trip for the rural teachers of Wentworth county

was made possible through the Trustees' Association and several Junior Farmers who gave their cars for the day. The trip was conducted by W. G. Marritt, agricultural representative. The party visited the Ontario Agricultural College and the farm in connection with the soldiers re-establishment hospital at Guelph and found the trip of educational value.

MANITOBA

RURAL CREDITS EXTENSION SERVICE

BY F. A. WEIR, DIRECTOR

THE Rural Credits Societies central office in Manitoba is not maintaining an extension service as such is generally understood by the term. A representative of this office, who is a graduate in agriculture acts as one director of a board of nine. In that capacity he is able to give the society the experience of other societies and a great deal of valuable advice on the Rural Credits Act as well as a certain amount of suggestion and assistance on agricultural matters.

At Dauphin, Mr. Chas. Murray who is a representative of the department of agriculture is also a director of the Dauphin, Ochre River, and Ste. Rose Rural Credit Societies. We would like to be able to appoint a local agriculturist to each of the societies' boards but unfortunately such is not possible at the present time.

The rural credit societies in my opinion afford an agriculturist the greatest opportunity of any line of work I know of, to get intimately in touch with the farmers themselves. Everywhere there are agricultural representatives striving to get in intimate touch with the farmers through boys' and girls' clubs, or through women's organizations. The rural credit societies put the agricultural representative at once in close personal touch with farmers. It shows him their financial conditions and the balance of their operations. It gives him a backing of eight of the most successful and public-spirited farmers in the district. These are the other members of the board of directors. It gives him a standing at once in the community, so that he is not in that unfortunate position so many find themselves particularly in when they first undertake this work.

AGRICULTURAL COLLEGE ADVISORY BOARD

THE new Advisory Board for Manitoba Agricultural College was appointed by an Order-in-Council presented to the Provincial cabinet by the Honourable Valentine Winkler, Minister of Agriculture. The government members of the Board are Mr. John Sweet of Thornhill, Mrs Leslie of Melita, Mr. Wm. Nichol of Brandon, Mr. R. M. Matheson, Brandon and Mr. Duncan F. Stewart of Thompson Municipality. The organization nominees ap-

pointed are Mr. R. J. Avison of Gilbert Plains, representing the Grain Growers Association; Mr. John Crawford, Chater, representing the Live Stock Associations, Mr. A. D. McConnell, of McConnell, representing the Manitoba Agricultural Societies; Mr. Robert Milne, B.S.A., of Lansdowne Municipality representing the College Alumni Association and the Honourable Valentine Winkler is ex-officio a member of the board.

MANITOBA PURCHASES ALBERTA CATTLE

THE Manitoba government has taken action to relieve the farmers in the drought areas of Alberta by purchasing 25,000 head of their cattle. The Honourable Valentine Winkler, minister of agriculture has appointed Mr. G. C. Sims as buyer under the Department who will have charge of all the buying of this stock for the government. As Manitoba has the assurance of a very generous harvest of hay and straw the animals purchased will be offered to the farmers of the province at cost in order that they may be brought

through the winter. The details are as follows:—

1. The animals will be bought for cash by the agent of the Manitoba Department of Agriculture and will be shipped to local points in Manitoba.

2. The Department will re-sell the animals to Manitoba applicants at cost price ex-shipment Manitoba.

3. Terms of Sale: One third cash, balance at seven per cent per annum payable in equal payments in 1920 and 1921.

4. The Department will be guided in its purchases by the number of applications made by Manitoba farmers. Application forms may be obtained from all municipal secretaries or direct from the Department of Agriculture at Winnipeg.

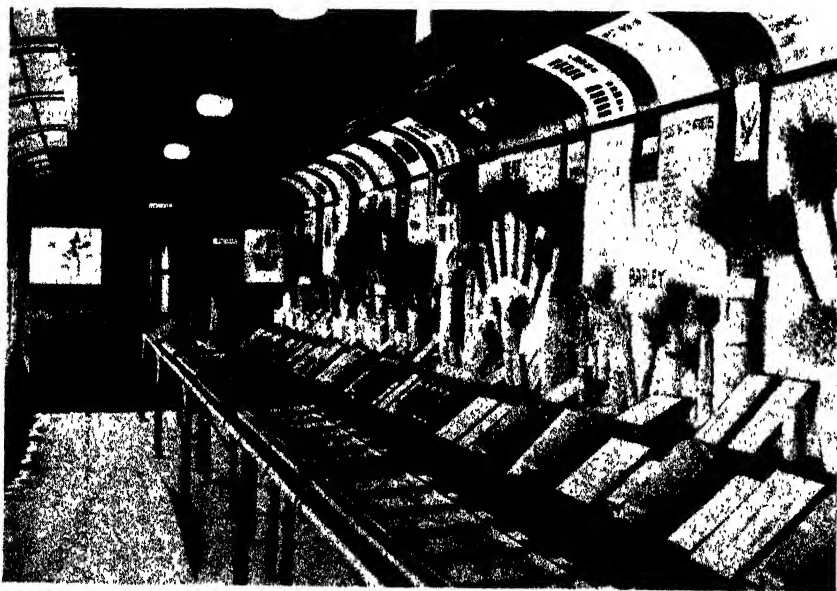
SASKATCHEWAN

BETTER FARMING TRAIN

THE tour of the better farming train of 1919 came to a conclusion according to schedule on June 28th, after a trip of over

led 31,438 persons, made up as follows:—10,444 men, 6,688 women, and 14,306 children.

The Honourable Charles Dunning,



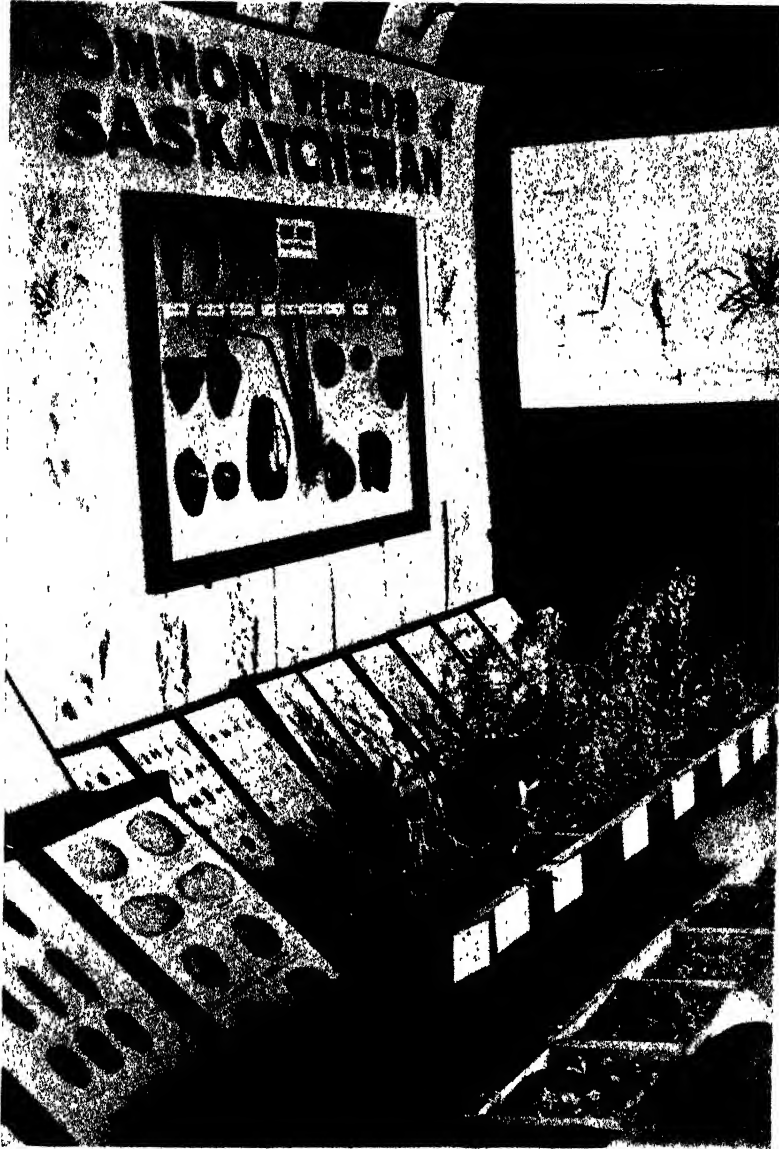
PART OF CEREAL EXHIBIT ON BETTER FARMING SPECIAL 1919.

1,900 miles in the province of Saskatchewan. The attendance of visitors to this "university on wheels" total-

Minister of Agriculture for Saskatchewan, who accompanied the train part of the time, pointed out in his

introductory addresses the purpose of the better farming train. The train was not sent around to teach farmers how to farm but was sent out for the purpose of bringing to

ists are working out the problems of the farmers and are expert in their own lines, and are in a position to impart information of real value to farmers. With this aim in view the



CORNER OF A DEMONSTRATION CAR ON SASKATCHEWAN BETTER FARMING SPECIAL.

the agriculturists of the province the knowledge gained by specialists in their various departments at the college of agriculture. These special-

train was equipped with various appliances, models, and specimens for illustrating the lectures, and practically all the teaching was done through

demonstrations with the life sized objects on hand. Live stock demonstrations were all of a practical nature. The candling of eggs and judging of poultry were carried on with actual fowls and real eggs. Grains, grasses, weeds, etc., were arranged in their various compartments so that visitors were able, during their short visit, to take in at a glance the lessons that were meant to be taught. Of special interest to the younger folks were the moving pictures which illustrated truths which could not otherwise be presented to them. On the whole the train was attractively, and scientifically equipped to most advantageously accommodate the visiting public.

Many important topics were discussed by the officials accompanying the train. Soil drifting is a serious problem in some parts of the province and experiments at the University farm have shown that the land cannot be farmed for wheat alone, rotations must be practised. The University farm is a practical farm where conditions of the average Saskatchewan farm are duplicated and the problems affecting farmers in all parts of the province are being carefully studied there with a view to securing uniform methods of overcoming the difficulties with which farmers have to contend. The far-

mers themselves are well acquainted with their work in general but they appreciate the special help given them by the professors and lecturers from the college.

At each stop the crowds were brought together at the train to hear the various addresses. Following these addresses practical talks on soil tillage, cereal crops, forage crops, and farm engineering were given by other lecturers. Farm engineering, building construction and ventilation, were also taken up and discussed. Poultry and dairy problems were handled by officials in charge who gave addresses and demonstrations using equipment carried on the train.

Home and school hygiene and other topics of special interest to women were taken up and discussed. In the household science car interesting demonstrations of the best and simplest methods of canning vegetables in summer for winter use and meats in winter for summer use were given by the lady officials in charge. Mr. W. B. Cumming, the representative of the Department of Agriculture, was in charge of the train and directed proceedings at each of the demonstration stops. Increased attendance over other years is an indication of the growing interest the public is showing in scientific agriculture in the province of Saskatchewan.

ALBERTA

MARKETING SERVICES

BY JAS. McCAIG, M.A., CHIEF PUBLICITY COMMISSIONER

SELLING services for poultry and eggs in Alberta have been established for two years. These services are not wholly provincial but are provincial and dominion jointly. The object of the Poultry Marketing Service is to provide assistance to farmers and farmers' associations in the province. The work is in charge of Mr. J. H. Hare. The office of the Poultry Marketing Service carries on active work by

literature and by holding meetings for the establishing and organizing of egg and poultry marketing associations in the country.

During their first year, or part of a year, ending December 1918, the business of the association was \$74,258.81. Individual farmers and farmers' associations at eighty-one different points in the province made use of the service and 137,370 dozens of eggs were marketed. Towards the

end of the year 14,863 head of poultry were marketed. The service takes account of either individual farmers or groups of farmers or of farmers' organizations already in existence.

The plan followed is simple. A local shipper is appointed who usually works on a commission basis and the aim is to use the same parties who have handled the egg business before. An advance is made to shippers from the central warehouse and after the eggs are graded and sold complete returns are made. The work is extending rapidly. Previous to the institution of this service separately quite a number of eggs were handled by the marketing service of the dairy branch. Last year there was only one grading warehouse, namely at Calgary. This year offices are established at both Calgary and Edmonton. An important part of the work of the poultry marketing service is the education of poultry raisers in proper methods of breeding, feeding of poultry and caring for poultry products.

BUTTER

The butter marketing service of the Provincial Department of Agriculture has been in operation since 1906, at which time Mr. Marker who had been employed previous to the inauguration of the province by the Dominion government, was regularly appointed dairy commissioner for Alberta.

Connected with the marketing services for butter is the control of the quality of the product from the farmers to the creameries and to the cold storage warehouses. Over 95 per cent of the cream supplies are now purchased from the farmers on a grade basis. The farmers are educated in the care of milk and cream. The manufacturers are also educated as to proper processes of manufacture, and the butter when

received is carefully graded and is sold on grade and returns made on a grade basis. Provision is made for an advance of 80 per cent on the estimated final returns to consignors.

The marketing service in butter does not mean that a very heavy part of the output is sold through the dairy commissioner's office. In 1918 the office handled the output of ten creameries out of over fifty and then there is the great product of the dairies besides. Alberta butter through the education of the department of agriculture is usually of rather high standard, the grades are established and accepted and the market for it is keen and active at all times. Consequently a great deal of the selling is direct selling but the work of the commissioner's office is responsible for the establishing and maintenance of quality and likewise serves as a balance-wheel in periods of glut or slow market. The provincial dairy commissioner's office has control of a quarter million dollars with which to make advances on butter.

POTATOES

The service of the department of agriculture in behalf of potato marketing consists in the bringing of buyers and producers together. Last year there was no surplus going out of the province. The year before last the Seed Branch of the department was instrumental in securing the marketing of approximately two hundred cars of potatoes. This was brought about by getting in touch with dealers in Montreal, Toronto, Regina, Winnipeg and other points, securing offers from them and submitting the offers to producers. The potatoes were inspected by the department and were shipped by the producers with sight draft attached to bill of lading and the purchaser was notified by the department of the shipment.

PART III

Junior Agriculture

DEMONSTRATIONS, COMPETITIONS, AND CLASS-ROOM STUDIES IN RURAL
LIFE FOR BOYS AND GIRLS

NATURE STUDY AND ELEMENTARY AGRICULTURE

NOVA SCOTIA

BY L. A. DEWOLFE, M.S.C., DIRECTOR, RURAL SCIENCE

IN Nova Scotia we do not separate nature study and elementary agriculture. We teach agriculture through nature study. We have even revised our nature study considerably. A few years ago we collected insects and wild plants, mounted them and hung them on the wall or put them away in cupboard drawers. Now we study the habits of growth of garden plants; and incidentally we meet many of their wild relatives. Instead of having a beautiful collection of butterflies and moths, we think it is more important to get acquainted with the life-history of the pests of our garden and orchard.

The study of this life-history is nature study. It also has a practical bearing on agriculture. The spreading of noxious weeds, their habit of growth and power of self-preservation, is interesting nature study. From this it is an easy step to combating them—which belongs to agriculture.

The examination of a dead bird is

usually simply an object lesson. To observe the bird's habits of feeding is a nature lesson. That introduces us at once to the beneficial work of insectivorous birds—which after all is agriculture. Agriculture in the schools, therefore, cannot well be divorced from nature study. It is nature study.

An eighteen-year-old girl cannot teach a farmer how to plow or harrow or plant potatoes. Through nature study, however, she may teach his boy something of the ravages of the white grub (larva of the June Beetle); and then place in his hands useful literature which will give the farmer a more intelligent knowledge of insect pests, their feeding habits, life-history and means of control. Thus through the nature study of the school, real agriculture may be taught.

Preliminary lessons in agriculture, such as soil physics, the dust mulch to retain moisture, the condition of the soil for good seed germination are, first of all, nature lessons.

NEW BRUNSWICK

BY A. C. GORHAM, M.S.C., DIRECTOR, ELEMENTARY AGRICULTURAL EDUCATION

IHAVE read with much appreciation the article by Mr. John Dearness on "Agriculture in Education," that appeared in the June number of *THE AGRICULTURAL GAZETTE*. I heartily endorse the British Columbia viewpoint which he brings out, although I can see how

divisions could easily be made between the subjects of nature study and elementary agriculture.

In New Brunswick these subjects are combined. The nature study and agriculture course prescribed by the Board of Education is in force. However, schools are not compelled

to have school gardens or home plots.

To establish a school garden and to obtain the grant offered by the Department of Agriculture, application must be made both by the trustees of that district and their

teacher, stating that they wish to take up this work as a permanent part of the course. This is not always adhered to, and, as you can see, means much undoing of our efforts.

SASKATCHEWAN.

BY A. W. COCKS, B.S.C., DIRECTOR OF SCHOOL AGRICULTURE

THE course of study for the public schools of Saskatchewan contains the outline of a course in nature study for grades I to VI inclusive and an outline of a course in agriculture for grades VII and VIII. The inspectors of schools are instructed to see that the work as outlined by the course of study is followed as closely as conditions justify. In the high schools and collegiate institutes, the work is continued under the heading of elementary science for the first two years and is compulsory, but in the third year it is known as agriculture and is an optional subject.

The use of the terms, nature study, agriculture and elementary science, as mentioned above, indicates that the course of the higher grades in agriculture and science should be considered as a natural development from the work of nature study in the lower grades. The work begins with an intimate personal study of the things of nature, more or less informal in character, but carefully adapted to the interests of the locality and the child.

In a province such as Saskatchewan, this nature study is almost bound to form a logical basis for the more advanced work in agriculture of the higher grades. In the early years the educational or disciplinary value of the work is chiefly empha-

sized, but as the pupils pass through the grades and give more attention from time to time to the actual cultivation of the soil in connection with school gardening, the economic values become more strongly emphasized.

It will thus be seen that the actual term used, that is, nature study or elementary agriculture, is relatively unimportant providing those in charge of the work thoroughly understand how the course should proceed from the natural investigations of the child in the realms of nature, to the practical application of scientific principles underlying such industries as horticulture and agriculture.

The same idea is evident in the arrangement of the work for the high schools, the first two years being devoted to general elementary science, which again is closely related to the interests of the farm and the home, and leading naturally to a more advanced study of the subject of agriculture from a scientific and economic point of view in the third year.

In this province, therefore, nature study and agriculture are not considered as two distinct subjects but as merely the names applied to the beginning and one of the ends of a subject which might be termed general science.

ALBERTA

BY JAS. MCCAIG, CHIEF PUBLICITY COMMISSIONER

WE should be past the stage of having to settle whether or not agriculture should be included in the materials through

which the educational process is carried on in common or elementary schools. Of course the adoption of the subject into the family of studies

which make up the body of material used for the education of boys and girls involves a disturbance of school-master routine and change of viewpoint with regard to educational material. It means some work to fit the subject to the elementary school room.

The chief things to settle in relation to the introduction of agriculture are:—

1. The purpose or function of the subject in elementary education.
2. The content or materials of agriculture which should be used.
3. The method of teaching the subject.
4. The fitting of teachers to deal with the subject according to its nature and to the dominant purpose which it is intended to serve.

Briefly the agriculture of the common school should be educational agriculture rather than agricultural education of a pointed sort. The justification for the inclusion of agriculture in the schools is its emerging as an organized body of knowledge of science representing important fundamental human interests. The science of agriculture has progressed to a stage at which its diverse materials have been harmonized into a cohesive and symmetrical body. The backing of science which the subject has makes it a very desirable introduction to science and thus gives to agriculture in the public schools the aspect of an educational rather than a training or vocational subject.

MATERIAL AND METHOD

With respect to the content or material of agriculture which should be used it must be recognized in the first place that the subject is so large that the making of a body of material for use must be selective, and it must be recognized in the second place that the public school has certain limitations in dealing with the subject of agriculture because agriculture is an art as well as a science. It is convenient to say that agriculture has the triple aspects of science, art and business. The business of agri-

culture is emerging into great prominence in adult practice and into considerable importance in the teaching of secondary school and college agriculture but it has not great importance in public school teaching. As the disciplinary rather than the vocational aim is the accepted one for the public school the business of agriculture has not much place. The teaching of agriculture as an art is likewise subject to some limitations. The teaching of the art includes the furnishing of experience which will give skill in the performance of the work of the farm. It is not easy to teach much about operations outside of the care and treatment of soil and plants. A little can be done with animals but this is a stimulation of interests rather than systematic teaching. Thus the soil and the plants constitute the large body of material suitable for common school use.

Regarding method, though the art of agriculture can not be exhaustively taught and though the science basis in agriculture constitutes the permanent educational material furnished by the subject, agriculture is an applied science and the concrete method must be used to illustrate and establish principles and laws. This is expressed in concrete studies of soils in the school room, in the school garden, on the farm, in railway and road cuttings and in home gardens and in the adjustment of treatment to suit the peculiarities of different soils. It is expressed likewise in the concrete study of all the plant processes such as germination, growth, reproduction, etc., in the study of all limiting factors of successful growth of the plant, the combating of these and the substitution of constructive and successful methods. In other words the science of agriculture should be taught through real agriculture and horticulture. This view of the subject does away with the deadening memorizing study and also does away with narrowing vocational teaching.

INEXPERIENCED TEACHERS

The fitting of teachers is a real difficulty. Teachers who are successful in dealing with most instrumental subjects such as reading, calculation, spelling and expression are successful by reason of an acquaintance with these subjects from earliest school days. Agriculture is not yet second nature with teachers but it must be incorporated in the experience of teachers just as other subjects are and must find a place in the public schools and high schools, in the normal schools and in summer schools. This feature of agricultural teaching is referred to in order to make a complete list of problems involved in the introduction of agriculture rather than to set out in full the method of preparing teachers. In fact there is no elaboration in presenting any of the four topics set out above in relation to the introduction of agriculture but in view of the fact that practice varies so greatly in different provinces with regard to the use of agriculture the statement of simple principles does not appear to be unnecessary. The right selection of materials and a right use of materials can be made to be applicable to both rural and urban schools and the right selection and treatment of these has never been attended with dissatisfaction in Alberta schools.

AGRICULTURE AND NATURE STUDY

The discussion of the subject of agriculture in common schools necessarily involves a discussion of nature study because it is up through the nature study movement that elementary agriculture has attained status. The nature study belongs under the Alberta organization characteristically to the first six grades of the common school but may be said to persist as a method in the laboratory teaching of grades VII and VIII. It is not necessary to divorce these subjects in fact it is necessary to give expression to both ideas in teaching practice. In the grades below VII nature study establishes wholesome interest, inquiring habits and gives likewise some information that may be a beginning of enthusiastic and intelligent gardening, farming and home-making. In grades VII and VIII the Alberta department has explicitly accepted the term agriculture and has accepted real agriculture without indecision or vacillation as to whether the thing they are teaching should be called nature study or agriculture. It does not include the whole body of disjointed informational details of adult practice nor does it include experience in daily operations but it does include a knowledge of essential laws and principles concretely established and understood.

Secondary school agriculture has a different purpose and significance.

NEW BRUNSWICK

BOYS' AND GIRLS' SHEEP CLUBS

IT has been decided to organize boys' and girls' sheep clubs in different parts of New Brunswick next autumn. They will be carried on under the joint auspices of the New Brunswick Department of Agriculture and certain of the banks which will lend the money for the purchase of the necessary animals. Following is the constitution and rules that will govern these clubs:—

The objects of the club shall be:

- (a) To create a deeper interest among our farm boys and girls in the business of sheep raising.
- (b) To encourage a general development of the sheep-raising industry in the province.
- (c) To raise the standard of the commercial flocks on these farms, by demonstrating the use of pure-bred rams.

RULES AND REGULATIONS

Any boy or girl between the age of ten (10) to eighteen (18) years may become a member.

Two grade shearling ewes will be distributed in December to each member. Members will be notified to call at a central point on a certain date to receive their sheep. Each pair will be marked with a number, and members will draw a number from a box and sheep corresponding to that number shall be his or hers, subject to rules of club.

Each member must care for his sheep in person and supply the bank and the Department of Agriculture with a record of wool sold, lambs sold or retained for breeding, and a record of methods of handling his

sheep. Special forms will be supplied for this purpose.

Members who wish to do so may pay cash for sheep at time of delivery or member may give note for twelve (12) months, endorsed to the satisfaction of the bank by parent or guardian and bearing interest at six per cent (6%).

Each member must, wherever possible, show their sheep and lambs at the special club members' fair in the fall. Prizes will be offered to members exhibiting at these fairs.

The ewes and their progeny shall be the property of the member.

The Department of Agriculture will supply instruction bulletin, etc., relating to care and management of sheep and forms for sending in all other reports.

DISTRIBUTION OF DAY-OLD CHICKS

BY A. C. MCCULLOCH, POULTRY SUPERINTENDENT

THE distribution of day-old chicks during the spring of 1919 was either exceptionally successful or most decidedly unsuccessful with each shipment. Most of the shipments we made early in the season were unsuccessful but later shipments arrived at their destination in a very satisfactory condition. There appear to be two main reasons for this. The shipment of day-old chicks in New Brunswick is novel to our express companies here and I believe the loss was due largely to lack of knowledge of how such a commodity should be handled. In some cases it seemed that the chickens were not given any more consideration than so much wood, paper or other inert material. Shipments were accepted and taken to points from which it was impossible to take them farther in less than forty-eight hours. In some cases where connections must be made

with other branch lines or boats the chicks were not dispatched with the haste they should have received. In a general way they were simply ignored. Loss of one or two shipments have shown those responsible for their safe transportation that they are a perishable commodity and must be treated as such.

During the latter part of the season we made several shipments with less losses than is ordinarily expected under the most favourable conditions. I hope to continue and even enlarge on the shipping to boys' and girls' poultry clubs of day-old chicks in preference to eggs, largely for the reason that we could have the birds hatched much earlier. I believe our damp cold weather early in the season is somewhat against the shipment of chicks but no doubt this can be overcome when the transportation companies learn to handle these shipments with more care and dispatch.

QUEBEC

DISTRIBUTION OF EGGS AND CHICKS.

BY BROTHER M. LIGUORI, OF THE POULTRY BRANCH

A distribution of 2,500 hatches of eggs, mostly of American breeds and specially of the Rhode Island Reds and Plymouth Rocks, was made this year by the Poultry Branch.

A distribution of 1,800 hatches among the boy and girl members of

local school fairs was made by the district representatives, who also kept the work under supervision.

The young women's clubs have also received 450 hatches. Only a few hundred chicks were distributed this year.

ONTARIO

THE HOT LUNCH IN THE RURAL SCHOOL

AN important women's institute activity in connection with Ontario rural school improvement is the installing of an equipment in the school whereby a hot lunch may be served to the children at the noon hour during the cold weather. The equipment consists of a two or three burner coal oil stove and cupboard containing the necessary utensils. A few of the advantages of serving such a lunch are:--

1. Digestion is aided.
2. Pupils are enabled to do better work in the afternoon.
3. Pupils are encouraged to take sufficient time to eat.

4. The mid-day meal is better balanced.

5. Children are more willing to go to school on cold days.

6. The relationship between home and school is strengthened.

The Department of Education is prepared to give a grant the second year to schools installing this equipment and also to the teachers. The Women's Institute Branch has mailed a copy of the manual on household science prepared by the Department of Education to all secretaries and presidents of the branch institutes. This manual contains information on the equipment as well as on the special grants which are given.

AGRICULTURAL AND VETERINARY COLLEGE OPENING DATES

Sept. 19 Ontario Agricultural College,
Guelph, Ont.

Sept. 25 Macdonald College, Ste. Anne de
Bellevue, Que.

Oct. 1 Ontario Veterinary College, To-
ronto, Ont.

Oct. 21 Manitoba Agricultural College,
Winnipeg, Man.

Nov. 4 College of Agriculture, Truro,
N-S.

PART IV

Special Contributions, Report of Agricultural Organizations, Publications, and Notes

ASSOCIATIONS AND SOCIETIES

EVENTS OF THE COMING MONTH

November 26th and 27th—Western Canada Shorthorn Association Second Show and Sale, Brandon, Man.

Sept. 8-13 Vancouver Exhibition, Vancouver, B.C., Secretary, H. S. Rolston, Vancouver.

CANADIAN PERCHERON SOCIETY

The annual meeting of the Canadian Percheron Horse Society was held in Calgary at the end of July. The secretary reported that during the year 572 Percheron stallions and 306 Percheron mares were imported into Canada. Resolutions were passed urging the importance of having proper types of the Percheron breed of horses kept on demonstration farms and at agricultural colleges and schools; asking for a discontinuance of licenses to grade and nondescript stallions; re-

questing that there be appointed at least one inspector on each stallion enrolment board who is familiar with the improved Percheron type, and urging upon the government the importance of encouraging action in securing foreign trade and in the breeding of heavy draught horses.

The following officers were elected: President E. A. Davenport, Acme, Alberta; vice president, W. B. Thorne, Aldersyde, Alberta; secretary, Wm. H. Wilson, Calgary, Alberta.

NEW PUBLICATIONS

DOMINION DEPARTMENT OF AGRICULTURE

LIVE STOCK BRANCH.

A Directory of Breeders of Pure Bred Sheep and Goats in the Dominion of Canada is issued as Pamphlet No. 17 of the Sheep and Goat Division of the Live Stock Branch. This pamphlet contains the name and post office address of the breeders of pure bred sheep and goats listed according to provinces specifying the breeds of the sheep and goats.

PUBLICATIONS BRANCH.

Pamphlet No. 7, The Publications Index Book, issued by the Publications Branch of the Dominion Department of Agriculture, presents a system for filing publications. By this system bulletins are numbered and filed as received. The title and file number is entered in the index book under the proper subject and the index book thus provides a subject directory and on being opened all the subjects are exhibited by a system of thumb indexing.

NEW BRUNSWICK.

Annual Report of the Department of Agriculture of the province of New Brunswick for the

year ending October 31, 1918 contains a summary of the agricultural prospects of the province as well as reports from the heads of the various divisions outlining their work for the year.

ONTARIO.

Bulletin 270, Judging Vegetables, by A. H. McLennan, B.S.A. Vegetable Specialist, is published by the Ontario Department of Agriculture. This bulletin contains standards for judging vegetables and gives a definite idea of the type of each vegetable with suggestions regarding uniformity of exhibit, size, weight, and appearance of specimens.

Circular No. 18, Women's Institute Leaflet, issued by the Women's Institute Branch of the Ontario Department of Agriculture, outlines the work carried on by the women's institutes of Ontario and contains the constitution and by-laws of federated women's institutes of Ontario as suggested by the provincial executive for consideration at district annual meetings.

Veterinary Science and Its Opportunities, issued by the Ontario Veterinary College under the Department of Agriculture of

Ontario, presents for the thoughtful consideration of the young man, who is contemplating a professional career, the field of veterinary science and its opportunities.

Bulletin 272 Contagious Abortion in Cattle, by C. D. McGilvray, M.D.V., issued by the Ontario Department of Agriculture states the nature and cause, methods of contracting, the symptoms, the methods of prevention and treatment of the disease, and gives a summary of leading points to be observed in the management of the herd.

The Thirteenth Annual Report of the Horticultural Societies, for the year 1918 contains the proceedings of the annual convention held at Toronto, February, 1919, and a detailed review of the financial transactions of the one hundred horticultural societies in the province of Ontario.

MANITOBA

Circular No. 54, Sweet Cream for Butter Making, by L. A. Gibson, Dairy Commissioner for Manitoba, issued by the Manitoba Department of Agriculture, outlines the methods of grading and care of cream, states the fundamental bases of keeping quality and the cause of defects in cream.

SASKATCHEWAN

The following circulars issued by the Department of Agriculture of the province of Saskatchewan have been prepared by John Bracken, Professor of Field Husbandry, University of Saskatchewan: *The Best Varieties of Farm Crops for Saskatchewan; Corn Growing in Saskatchewan, Alfalfa in Saskatchewan; Alfalfa Seed Production; Seed Grain, Seed Treatment, and Seeding, Summer Fallow, The Tillage of Stubble Land; The Tillage of Prairie Sod; and Winter Rye. Hay and Pasture Crops for Saskatchewan*, Field Husbandry Circular No. 14, deals with annuals, biennials, and perennials and treats of their cultivation under dry conditions.

Circular No. 26, *Durum Wheat*, and Circular No. 27, *The Culture of Flax in Saskatchewan*, are by Professor John Bracken, and A. W. Henry, Instructor in Cereals, University of Saskatchewan.

Sweet Clover is a Field Husbandry Circular prepared by L. E. Kirk, Instructor in Field Husbandry, University of Saskatchewan.

The Department of Agriculture of the province of Saskatchewan has issued a circular giving rules to observe and precautions to take in growing profitable crops on the drier lands of Saskatchewan.

ALBERTA

The Egg and Poultry Marketing Service for Alberta, prepared by the joint federal and provincial offices is issued from the office of Publications, Department of Agriculture, Edmonton, Alta. This pamphlet outlines

the objects of the marketing service and gives complete information on the production, grading, and marketing of poultry and eggs.

Four short bulletins compiled by the provincial committee on field crop experiments have recently been issued by the Alberta Department of Agriculture. This committee consists of the agronomists at the schools of agriculture and G. H. Cutter Professor of Field Husbandry, who is the chairman. The four bulletins are No. 1 "*Suitable Varieties of Small Grains for Alberta*"; No. 2, "*Seed, Preparation of Seed, Seeding*"; No. 3, "*Soil Cultivation*"; No. 4, "*Winter Rye*."

BRITISH COLUMBIA:

The Thirteenth Annual Report of the Dairy-men's Association records the work of that body during the year 1918 along with the proceedings of the annual meeting held at Kelowna, B.C., on January 15th and 16th.

A pamphlet by Wilfred Sadler, of the Department of Dairying, University of British Columbia, deals with dairy problems and is issued by the British Columbia Department of Agriculture. In this pamphlet the souring of milk and the production of good butter are discussed in detail.

The Twenty-Ninth Annual Report of the British Columbia Fruit-growers' Association for the year ending December 31, 1918, contains a detailed statement of the activities of that association for the year 1918 and gives a synopsis of the proceedings of the annual convention held in King's Hall, Penticton, B.C., in January, 1919.

Bulletin No. 82, Agricultural Statistics, 1918 issued by the Department of Agriculture of British Columbia, contains statistics of the agricultural industries of the province of British Columbia. These statistics relate to areas of land under cultivation; production of various crops; animals, animal products, and climate as affecting agriculture. Included also are statements relating to express movement of fruits and vegetables, and imports of all agricultural food products.

MISCELLANEOUS

Fifty Years of Canadian Progress 1867-1917 by Ernest H. Godfrey, F.S.S., issued by the Dominion Bureau of Statistics, gives a statistical review of the progress achieved by Canada during the fifty years of its existence as a federal union.

Dairy Factories, 1917, Part II of the Census of Industry, 1917, prepared by the Dominion Bureau of Statistics in collaboration with the Federal Dairy and Cold Storage Branch, the Quebec Bureau of Statistics, and the Dairy Branches of the Provincial Departments of Agriculture, records the results of

the Census of Industry for the year 1917 in respect to creameries, cheese and condensed milk factories. In addition to the quantities and values of products, the data included

comprise particulars of capital invested, labour statistics, material used, and other expenses arranged by counties and provinces throughout the Dominion.

NOTES

Mr. Alfred Atkinson, B.S.A., has been appointed president of the Montana Agricultural College at Bozeman. Professor Atkinson was born in Huron County, Ontario, is a graduate of the Ontario Agricultural College, and has for a number of years been professor of agronomy at the Montana Agricultural College and Experiment Station.

The headquarters for women institutes members attending the Canadian National Exhibition is in the women's Institute tent just west of the government building. An experienced lecturer is in attendance at the tent to discuss with the officers and members of the institute ways and means whereby work in their respective localities may be made most effective and is also prepared to outline the programme of institute activity.

A feature of the display included in the agricultural exhibits at the Canadian National Exhibition is a collection of canned meats, vegetables and fruits put up by the women's institute branch. A qualified demonstrator is in charge to explain methods and to take the names and addresses of those

who wish to receive copies of bulletin on "Preservation of Foods."

Miss Olive E. Hayes, a graduate of Macdonald Institute, Guelph, and who was for a time a demonstrator and lecturer with the Women's Institutes of Ontario, has been appointed Provincial Household Science Instructor in charge of the Household Science Branch of the Department of Agriculture of British Columbia. The Superintendent of Womens' Institutes in that province is Dr. David Wainock, Deputy Minister of Agriculture.

An act respecting poisons passed during the last session of the provincial legislature in Alberta, allows persons to set out poisoned grain in reasonable quantities and of reasonable strength for the destruction of gophers upon their own premises or upon any road allowance or highway. Also poisoned grain may be set out on any unoccupied land adjoining such premises for the destruction of gophers thereon. South of the 55th degree, north latitude, no person shall set out other poisons except on his own premises and mixed with grease and placed in a hole in the ground or in a vessel.

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The Canadian Farm, Toronto, Ont.

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Recent Inventions of Interest to Agriculture. C. J. Lynde, Macdonald College, Que., page 7.

The Purchase of Canadian Cheese. J. A. Ruddick, Dairy and Cold Storage Commissioner, page 8.

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Japanese Methods of Wireworm Control. R. C. Treherne, Dominion Entomologist, Entomological Laboratory, Vernon, B.C., page 206.

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The Rod Cultivator. W. H. Fairfield, Superintendent, Dominion Experimental Farm, Lethbridge, Alta., page 961.

INTERNATIONAL FARM CONGRESS

The Saskatchewan Department of Agriculture is again transporting exhibits of products from Regina to Kansas City and return, free of charge to Saskatchewan farmers. These exhibits are for the International Soil Products Exposition and Farm

Congress, which will take place this year at Kansas City, Mo., September 24th to October 4th. All exhibits should be sent to Regina by September 10th, where they will be inspected, and those of worthy quality will be sent forward.

PART V

The International Institute of Agriculture

FOREIGN AGRICULTURAL INTELLIGENCE

All communications in regard to this section should be addressed to T. K. Doherty International Institute Commissioner, Department of Agriculture, West Block, Ottawa.

SCIENCE AND PRACTICE OF AGRICULTURE

GENERAL INFORMATION

- 272—**The Economic Resources of Morocco and Their Exploitation After the War.**—BERNARD AUGUSTIN, in *Bulletin de la Société d'encouragement pour l'Industrie nationale*, Paris, May-June, 1918.

The author describes the geography of the country and gives details of the agricultural production. The chief fruits grown are olives figs and oranges. From 10 to 13 million bushels of wheat is produced yearly and about 17,000,000 bushels of barley. The last census gives the number of cattle as 856,000 and the number of sheep as 4,000,000. Important experiments are being made in cotton growing and success is expected. The mineral resources of the country are described.

- 273—**Economic Development of French West Africa.**—DYBOWSKI, in *Bulletin de la Société d'encouragement pour l'Industrie nationale*, Paris, May-June, 1918.

The author traces the history of the large colony of French West Africa. The trade of the colony which amounted to \$6,000,000 in 1891 reached \$60,000,000 in 1916.

The forests of the country constitute a great resource. They cover about 15,000,000 acres. The products of the palm form another great source of wealth. It has been demonstrated that with irrigation cotton may be grown successfully.

A great future is promised for agriculture in the country. With the waters of the Niger and the Senegal many millions of acres of rich lands may be irrigated.

- 274—**Economic Development and Agricultural Production of Madagascar.**—YOU ANDRÉ, in *Bulletin de la Société d'encouragement pour l'Industrie nationale*, Paris May-June 1918.

The author gives an account of the mineral and agricultural resources of Madagascar. The country possesses immense forests covering 25 to 30 million acres. The chief minerals are iron, lead, copper, zinc, cobalt, nickel, silver, gold, lignite, bitumen and

graphite. Cattle raising is an important industry in the northern plains.

The foreign trade of the country increased from \$3,500,000 in 1896 to \$37,400,000 in 1916.

CROPS AND CULTIVATION

- 277—**Occurrences of Frosts in the United States.**—REED, W. G., in *United States Department of Agriculture, Office of Farm Management, Atlas of American Agriculture, Part II, Climate*, Section 1, pp. 1-12, Washington, D.C.

This work takes up: (1) dates of the last killing frost in spring; (2) dates of the first killing frost in fall; (3) length of the frostless period between the last and first frosts considering as equivalents of killing frosts temperatures of 0°C, and lower.

The observations made at 4,000 stations of the Bureau of Meteorology cover 20 years (1895-1914) at 600 of them, 10 to 20 years, at 1,800 others, and 5 to 10 years at the remaining 1,600.

Last Killing Frost in Spring.—On a map in the Atlas, lines are drawn showing the places where frost occurs on the average on the same date. Since to establish a curve for each day would make the map too complicated, only a few dates are chosen, the 1st, 11th and 21st day of each month from March 1st to June 1st for East of the Rockies, and for West of the Rockies the 1st day only.

The date line of March 1st, for example, starts at Charleston, South Carolina, crosses northern Florida, and extends westward through the Gulf States, southeastern Arizona to the coast of southern California. In places along the northern boundary of the United States and at the higher altitudes in the western part of the country the average date of the last killing frost is later than June 1st.

First Killing Frost of Fall.—The area for which the average dates of first killing frost are earlier than September 1st is much the same as that for which the average dates of last killing frost in spring are later than

June 1st, although somewhat smaller in extent. Generally where the first killing frost of fall is early the last killing frost of spring is late.

Season without Frost.—The length of this period varies from 365 days at Key West, Florida, to considerably less than 90 days in the extreme northern portion of the country and the more elevated portions of the West. This large area is, for the most part, not available for general farming; where the rainfall is sufficient it is mostly forested.

281—The Influence of Plant Residues on Nitrogen Fixation and on Losses of Nitrate in the Soil.—HUTCHINSON, H. B., in the *Journal of Agricultural Science*, Vol. IX, part I, pp. 92-111. Cambridge, August 1918.

The incorporation of plant residues with the soil may give rise to a number of different changes, any one of which tends to dominate the rest according to the varying conditions of the general environment—air and water supply, temperature, the reaction of the soil itself. The generally accepted statement that organic matter possesses value on account of its humus forming properties does not express fully the influence of organic residues, and it is quite probable that the primary and intermediate stages of decomposition are equally important from the standpoint of soil fertility.

Laboratory, pot, and field experiments were made by the author to determine the influence of carbohydrates on the fertility of field soils, the utilization of plant residues and sugar for nitrogen fixation and the influence of sugar and plant residues on losses of soil nitrates. The results of the experiments show:

Plant residues incorporated in the soil increase the fixation of nitrogen. In laboratory experiments an increment of upwards of 6 mgm of nitrogen per gram of plant residues occurred, but in pot experiments gains of 9 mgm were obtained.

On the field scale, definite increases of crop, equal to 20 to 54 per cent resulted from the application of sugar when the soil was favourable. These increases were attributable to nitrogen fixation.

Since the difference between the action of sugar and plant residues is largely one of degree and not of type, it is reasonable to suppose that such substances as stubble, leaves, and other complex organic materials may also serve to contribute indirectly to the resources of soil nitrogen.

The general soil conditions making for the successful operation of nitrogen fixation processes are, in addition to the supply of some source of energy, a suitable temperature, the presence of phosphates and a supply of basic material such as calcium carbonate.

Even under the most favourable circumstances for nitrogen fixation, there occurs a period during which adverse processes come into play, and it is not advisable that a crop

be introduced before these have run to completion.

Under unfavourable conditions and particularly during periods of low temperature, these adverse changes may persist without any subsequent gains of nitrogen in the soil.

The addition to the soil of sugar or plant residues may cause denitrification during a certain period, after which nitrification may begin again.

286—The Principles of the Liming of Soils.—SHOREY, S. E., in *U.S. Department of Agriculture, Farmers' Bulletin* 921, 30 pp. Washington, March, 1918.

Information for the use of farmers regarding the materials used in liming, their preparation and use, as well as a discussion of the chemical changes brought about in the soil by lime, so far as they are known. The author discusses in detail the relative merits of different forms of lime, and the factors which determine the time and method of application.

An appendix gives a list of terms commonly used in discussing the agricultural use of lime.

289—Use of Cover Crops in New Jersey.—DICKEY, J. B. R., in *New Jersey Agricultural Experiment Station, Circular* 85, 4 pp. New Brunswick, N.J., July, 1917.

Recommends the use of leguminous cover crops to partially replace the expensive nitrogenous fertilizers. Where a good leguminous crop is ploughed down, two per cent of nitrogen in the fertilizer will give a good crop of potatoes or truck. For corn or grain grown after a legume, little should be required besides acid phosphate. Directions for growing cover crops are given in the circular.

291—The Influence of Ammonium Sulphate on the Germination and the Growth of Barley in Sand and Soil Cultures Kept at Different Moisture Contents and at Various Osmotic Concentrations of the Soil Solution.—WOLKOFF, M. I., in *Soil Science*, Vol. V, No. 6, pp. 421-479. Baltimore, June, 1918.

The author seeks to determine the fertilizing value of ammonium sulphate under some variable conditions as they may be found in agricultural practice. He first reviews some 270 publications on the subject, then describes his own experiments, the objects of which were: to determine the relation of the moisture content of the soil to the effect of ammonium sulphate in the germination, growth and development of barley—to determine how a given agricultural plant, when subjected to different applications of the necessary, or even the unnecessary, elements that go to make plant tissue, reacts when the moisture supply is varied within the limits often met in normal field operations.

The barley was grown in two series of pots containing sea sand and light sandy loam,

the moisture content of which was kept at 20, 40, 60 and 80 per cent of the water holding capacity. The plants were germinated in moist sand and, when grown to about two inches in height, transplanted into pots. The fertilizers used were ammonium sulphate, monopotassium phosphate, magnesium sulphate and ferrous sulphate. These ingredients were added in solution, while calcium carbonate was mixed with the sand previously to the introduction of the solution. The author also studied the effect of potassium chloride, sodium chloride, sodium nitrate, calcium sulphate, aluminum sulphate, and sodium silicate added to the above mentioned fertilizers.

The osmotic concentration of the nutrient solutions was determined both before and after the application of these solutions to the sea sand or the light sandy loam.

Results.—The moisture content of the soil has a very marked influence on the growth and the development of plants. In the sand cultures the plant yield increases with the increase in moisture content from 20 to 80 per cent of the water-holding capacity of the sand. In the sassafras light sandy loam the plant yield increases with the increase in moisture content up to 60 per cent of the waterholding capacity of the soil, while the further increase in moisture brought a considerable decrease in the yield of dry matter of barley. The plant growth in the soil or sand kept at a moisture content equivalent to 20 per cent of saturation was very small, and without any relation to the water present, as compared with the series of the higher moisture content.

With a constant moisture content in the sand, the plant yields increased with the increase in the application of ammonium sulphate, calcium carbonate or monopotassium phosphate. The response in the plant growth to the application of these salts in the amounts used was in the order named. In the sassafras light sandy loam a similar response to applications of nitrogen was noticed, but not to those of lime, and very little to those of phosphorus.

The difference in plant growth in the various moisture contents was attributed to the two factors, the total plant-food remaining the same: (a) the difference in concentration of the soil solution, and (b) the aeration of the soil.

The osmotic concentration of the soil solution following the normal application of a fertilizer is not great enough to influence plant growth, if the moisture content of the soil is at its optimum (about 60 per cent of saturation). It becomes an important factor only when the moisture content of the soil is considerably reduced (to 40 per cent of the saturation, or lower).

The osmotic concentration of the soil solution at the end of the growing period (30 days) was smaller than at the beginning of the experiment. The decrease was greater

in the sand than in the soil, and also in the lower moisture content than in the higher moisture content of either the sand or the soil.

The nutrient solution consisting of 0.4 gm. ammonium sulphate, 0.8 gm. monopotassium phosphate, 2.0 gm. calcium carbonate, 0.2 gm. magnesium sulphate, and 0.05 gm. ferrous sulphate per 2 kgm. of sea sand cultures with a moisture content equivalent to 60 per cent of the waterholding capacity was benefited by the additional application of magnesium and ferrous sulphate, and also by small applications of potassium chloride, sodium chloride, sodium nitrate, calcium sulphate, and sodium silicate. The beneficial effect of these salts on plant growth was attributed to the improvement in the balance of the ions of the component salts in the resultant soil solution. Aluminum sulphate under similar conditions had caused some injury to plants. The rigidity of the straw of plants was modified by different salts added to the nutrient solution. A proper balance in the nutrient solution is essential for the rigidity of the straw. The lodging effect of the large amount of nitrogenous material may be entirely subdued by modifying the proportions between the component salts in the nutrient solution in sand cultures.

The germination of seeds of barley is influenced by the same general agencies that effect the growth of plants, although not to the same extent. Thus, in sand, barley germinated as well when the moisture content was reduced to 10 per cent as when it was raised to 80 per cent; while in four different soils germination did not take place at 20 per cent of the water-holding capacity and it was retarded at 80 per cent.

The treatment of the sand or soil with a nutrient solution at the high moisture contents had very little effect on the germination of barley seeds. With the decrease in moisture content there was noticed some retardation in seed germination, when it was accompanied by the application of nutritive salts. A normal application of fertilizers, if they are well incorporated in the soil, does not have any injurious effect on the germination of barley seeds. If the fertilizer is applied in drills at the time of seeding, the soil solution immediately surrounding the seeds may become very concentrated, and, consequently, an injurious effect on seed germination may be expected, especially if a drought prevails during the germination period.

310—Yields of Winter Grain in Illinois.—BURLISON, W. L., and ALLYN, M. O., in *University of Illinois, Agricultural Experiment Station, Bulletin* No. 201, p. 97-110, Urbana, June 1917.

A report and brief discussion of the results of field experiments with different varieties of winter wheat, rye and oats made in Illinois. The data are collected in tables.

Variety tests of winter wheat were begun at De Kalb in 1917, with Dawson's Golden Chaff used as a standard for comparison. Turkey Red seems to be most productive variety in Northern Illinois; the other most productive varieties, tested for at least three years are: Turkey 9-233, Malakoff 5-458, Minnesota Reliable, Kharkof, Wheedling 5-464, and Malakoff. These yielded respectively 37.2, 36.7, 36.1, 32.6, 35.2 and 31.4 bushels per acre. Turkey Red produced an average of 35.4 bushels per acre during 7 years.

All the winter barley was winter killed. Four tests of winter rye the following bushels per acre; Petkus 55.5, Wisconsin Pedigree 47.0.

Experiments with winter wheat at Urbana were begun in 1904, with Turkey Red used as standard for comparison. The average yield per acre during 5 years were: Turkey Red (12 years) 42.4, Malakoff 42.0, Fully, 42.1, Hungarian 39.7, Pesterboden 41.8, Beloglina 40.4, Kharkof 42.6, and Dawson's Golden Chaff 39.5. Other varieties promising good results in Central Illinois are Turkey Hybrid 509 and Dawson's Golden Chaff 9-225.

At Fairfield in Southern Illinois experiments with winter wheats were begun in 1906 with Fulcaster as a standard for comparison. The following average yields were given during three years: Fulcaster 15.9, Economy 16.9, Missouri Pride 15.8, Indiana Swamp 14.9, Wheedlings 14.5, Harvest King 14.3 and Rudy 12.3. Hard wheats such as Turkey Red and Karkoff did not do well in southern Illinois.

Finally the Bulletin contains a table indicating the characteristics of the varieties of winter wheat tested.

311.—Results of Growing Manitoba Wheat in the Department of Vaucluse, France, in 1918 (1).—ZACHAREWICZ E., in *Comptes rendus des Seances de l'Academie d'Agriculture de France*, Paris Jan. 22, 1919, pp. 115-116.

The author gives an account of the results obtained with Manitoba wheat. The area sown was a little over 2 acres. The seed was sown on March 25, 1918, at the rate of 3 bushels per acre. The growing period, which covered 115 days, was normal. The yield obtained was at the rate of 21 bushels per acre.

The several experiments made by the author show that Manitoba wheat will grow well in south eastern France, where hitherto only winter wheat was sown.

327.—Satisfactory Varieties of Fruits in Ohio.

—GREEN W. J., THAYER P., and KELL, J. B. in *Ohio Agricultural Experiment Station Bulletin* 313, p. 603-614, Wooster, Ohio, March 1917.

Lists and descriptions of varieties of apples,

(1) See also *Agricultural Gazette*, June 1919, p. 596, No. 1349.

pears, prunes, peaches, cherries and small fruits considered satisfactory for cultivation in Ohio, after experience covering 25 years in the Experiment Station orchard, in the orchards of co-operators, and from observation and study of horticultural problems in various sections of the state.

LIVE STOCK AND BREEDING

334.—Feeding Work Horses in Kansas.—McCAMPBELL C. W. in *Agricultural Experiment Station, Kansas State Agricultural College, Circular* No. 62, 16 pp. Manhattan, Kansas, November 1917.

Far less experimental work having been conducted with horses than with any other class of domestic animals, less is known of the influence of different feeds and combinations of feeds upon them than on cattle, sheep, pigs, etc. In order to obtain more information on the subject the Kansas Agricultural Experiment Station conducted an investigation with horses belonging to the field artillery.

In a table which takes up two pages in the Institute Bulletin a summary of the experiments is given, showing the following results:

A mixture of corn, bran and linseed oil meal in the proportion of 6:3:1 by weight is a satisfactory substitute for oats for work horses when both are fed with timothy or prairie hay.

Two rations containing the same quantities of corn and oats, one containing 4 lbs. of bran and the other 1 lb. of linseed meal, were equally satisfactory except that the second gave a slightly better coat.

Equal weights of oats and barley showed equal results, however the oats might be preferred on account of the better effect on the general condition of the horses.

In small doses sugar is considered a good relish for horses, but the substitution of 5 lbs. of sugar for 4 lbs. of oats was unsatisfactory: the horses receiving the sugar perspired more easily and abundantly than the others, however, they had excellent appetites and glossy coats.

The comparison made between alfalfa and bran showed that at equal weights the two feeds have about an equal value.

The ration consisting of alfalfa hay, corn and oats, compared with the rations of oats and prairie hay, proved less expensive and gave a larger increase in live weight.

One pound of alfalfa hay has the same nutritive value as 2 pounds of timothy hay or prairie hay. Alfalfa hay reduced the quantity of grain necessary in the ration by 19 per cent. and the amount of hay by 30 per cent; the cost of feeding was less and the gain in live weight greater.

Timothy hay was slightly superior to prairie hay.

335.—Feeding Pure-Bred Draft Fillies.—

EDMONDS, J. L., in *University of Illinois Agricultural Experiment Station, Bulletin* No. 192, p. 426-448, Urbana, Ill., Dec., 1918

The object of the investigation was to determine the efficiency of alfalfa hay, corn, and oats in growing pure-bred draft fillies to two years of age. The results seemed to indicate that a liberal portion of well-cured legume hay should be the foundation of feeding young, growing horses. Along with this roughage enough grain should be fed to produce the desired growth. The bulletin gives details of the rations, quantities consumed, and gains in weight, etc.

339—Cattle Raising and the Meat Industry in Brazil.—O. *Criador Paulista*, Vol. XIII, No. 12, pp. 313-317. San Paulo, Dec., 1918.

Data extracted from a memoir presented by M. Simoes Lopes, of the State of Rio Grande do Sul, to the President of the Republic of Brazil:

During the five year period 1913-17 Brazil from being an importer of meat became an exporter. In 1913 she imported 14,724 tons and exported 244; in 1917 she exported 73,167 tons and imported 1,593. Of the exports in 1917, 66,541 tons were of frozen and refrigerated meat.

In 1912 there were 30,705,400 cattle in Brazil. It is estimated that the number of growing cattle in 1917 amounted to 32,318,519.

It is probable that in view of the progress being made in the frozen meat industry, the dried meat industry will be given up as in Argentina. However, it still has some importance.

343—Lessons on Pork Production for Elementary Rural Schools.—MILLER, E. A., in *U.S. Department of Agriculture, Bulletin* 646, 25 pp. Washington, 1918.

The importance of the subject and the readiness with which it lends itself to the teaching of breeding, feeding and management of farm animals gives it unusual educational value.

The bulletin which contains outlines of lessons, was published with a view to introducing into schools in a definite way the study of animal industry.

The nine lessons are on the following subjects, each being accompanied with suggestions for practical exercises: (1) types and breeds; (2) pig-houses; (3) swine judging; (4) fattening meat hogs; (5) selecting breeding stock; (6) dressing and curing meat; (7) sow and pig management; (8) forage crops; (9) sanitation and diseases.

345—The Self-feeder for Hogs.—ASHBROOK, F. G., and GONGWER, R. E., in *U.S. Department of Agriculture, Farmers' Bulletin* 906, 12 pp. Washington, Dec., 1917.

In an experiment made at the Experimental Farm at Beltsville, Maryland, two groups of pigs each were fed for 70 days, one group being hand-fed and the other fed with a self-feeder. The ration consisted of corn meal, middlings and tankage. The self-fed

pigs gained much more rapidly by consuming a larger daily ration in proportion to live weight than did the hand-fed pigs, but this more rapid gain did not require any more feed in proportion to the gains in live weight. In fact the self-fed pigs required a little less feed to gain 100 pounds in weight, than was required for the hand-fed.

In another experiment, lasting 28 days, five pigs placed in an excellent rye pasture and receiving besides in a self-feeder a mixture of corn meal and tankage (38:1) made a daily gain of 1.61 lbs. and consumed, besides pasture, 3.6 lbs. of feed per 1 lb. gain. Five other pigs in a rye pasture and receiving in a self-feeder a mixture of shelled corn and tankage (16:3:1) made an average daily gain of 1.53 lbs. and consumed, besides pasture, 3.3 lbs. of feed per lb. of gain. A third group of five pigs, in rape pasture, and receiving besides in an ordinary trough corn meal, middlings and tankage (5:4:1) gained daily 1.48 lbs. and consumed 3.7 lb. per lb. gain.

A compilation of results obtained in numerous experiment stations of the country with about 600 pigs show that the pigs fed in ordinary troughs consumed on the average 5.47 lbs. per day, gained 1.23 lb. per day, and consumed 4.45 lbs. per 1 lb. gain, while for pigs fed in self-feeders the corresponding figures were 8.0-1, 92-4.17. These results show clearly that more rapid gains are obtained with the self-feeder than by the best of hand-feeding methods, partly owing to the larger daily consumption of feed per head and partly to the more efficient use of the grain fed.

Details of the construction of self-feeders with illustrations are given.

346—Breeds of Swine in the United States.—ASHBROOK, F. G., in *U.S. Department of Agriculture, Farmers' Bulletin* 765. Washington, March 1917.

General information concerning the different breeds of swine raised in the United States, their origin, general appearance, development, and powers of adaptation. There are two distinct types of pigs: the lard type and the bacon type. In the United States the demand is for the lard type, consequently the majority of feeders produce the rapid fattening heavily fleshed types. The bacon breeds are not raised in very large numbers. Where corn is not relied on as the principal grain for hogs, the production of choice bacon is more general than in the corn belt.

The principal breeds of the lard type in the United States are the Poland-China, Berkshire, Chester White, Duroc-Jersey and Hampshire. The bacon type hogs are the Tamworth and the Yorkshire. Descriptions of all the breeds mentioned are given in the Bulletin.

488—Studies in Inheritance of Certain Characters of Crosses between Dairy and Beef

Breeds of Cattle.—GOWEN, J. W., in *Journal of Agricultural Research*, Washington, Oct. 7, 1918; pp. 1-57.

This paper presents a preliminary analysis of the data from the first-generation crosses to the prominent dairy breeds of cattle on the beef breed Aberdeen-Angus. The work has been undertaken at the Maine Agricultural Experiment Station as a link in the chain of evidence necessary to the final solution of the problems which are connected with the inheritance of milk and butter-fat production. At the Maine station a crossbred herd is being formed to accumulate as much material as possible for the analysis of heredity variation. The herd has now gone into its second generation.

Results so far obtained are:

(1) Black body colour is dominant to the other colour in the first generation. In the second generation an orange-coated bull and a dark Jersey dun-coated heifer were segregated out. This is to be explained on the basis of a recessive dilutor in the Guernsey, segregated out along with the black colour. The dark heifer shows that the Jersey does not normally possess this factor.

(2) It has been shown that white marking of the body taken as a whole appears as dominant. Study of the white areas, however, indicate that this is due to white in the inguinal region only, for this alone appears as such a dominant. The white spots on the face (star, star snip, and blaze), neck, shoulders, rump, flanks and legs are, in general, suppressed in their offspring when such animals are mated to solid colour.

(3) The pigmented muzzle is dominant to the one not so pigmented.

(4) A pigmented tongue is dominant to a non-pigmented one.

(5) A black switch seems to cause the suppression of other switch colours in the offspring.

(6) There were exceptions to the generally accepted hypothesis of simple dominance for the polled character which requires a subsidiary hypothesis. The hypothesis suggested is that the testes have some action on the presence or absence of horns. If this proves true, it forms an interesting parallel between cattle and sheep, in which the sex glands are known to produce such changes.

(7) The qualities of beef production are shown to be divisible into four general regions of the body: head, fore quarters, barrel, and hind quarters. The type of head and heavy, deep-fleshed fore quarters are transmitted to the offspring when either parent is of Aberdeen-Angus breed. The body and hind quarters appear intermediate, but resemble most the dairy parents. For the improvement of the beef qualities of dairy breeds the first generation crosses result in an increased value of the beef qualities in the fore quarters without materially influencing the hind quarters.

(8) Data are given on the milk and fat production of some of the crossbreds. The results indicate that milk and fat production behave separately. High milk production is dominant to low, but high fat percentage is recessive to a low-fat percentage in the milk.

495—Some External Parasites of Poultry, and Methods of Control.—MOTTE, D. C., in *Ohio Agricultural Experiment Station Bulletin* 320, p. 139-156; Wooster, Ohio, 1918.

Contains information to poultry raisers regarding some of the external parasites of poultry found in the State of Ohio. The parasites dealt with are: the small body louse, the large body louse, the head louse, the poultry mite, the bird mite, harvest mites, the scaly leg mite, the depluming mite, the stick-tight, or southern chicken flea, the European hen-flea, bedbugs.

The author advises the following methods of control: For the small body louse (*Menopon triticocephalum*) and the large body louse (*Menopon biserialatum*): gasoline 3 parts, crude carbolic acid (90 to 95 per cent tar acid), 1 part, plaster of Paris as much as the preceding liquids will moisten. Mix thoroughly and then allow to dry for a few hours and store in air-tight containers. The birds are dusted with the powder.

For the head louse (*Lipecurus heterographus*) one part mercurial ointment mixed with two parts vaseline or lanolin.

For the red mite, poultry mite, or roost mite (*Dermanyssus gallinae*) and the bird mite (*D. hirundinis*): frequent cleaning and liberal application of a good insecticide. For painting or spraying the perches, dropping boards, walls, floors, and nests, the following solutions are good: (1) 3 parts of kerosene mixed with one part of either 90 to 95 per cent crude carbolic acid, or commercial cresol; (2) measure out in a 5-gallon stone crock 3½ quarts of raw linseed oil. In another container dissolve in as little water as is required, 1 pound 6 ounces of commercial lye. Start with one-half pint of water and add more very slowly, if more is needed to dissolve the lye. Let this solution stand for three hours to dissolve the lye thoroughly and cool. Then very slowly add the lye solution to the raw linseed oil, taking not less than 5 minutes to add it. The oil should be stirred while the lye is being added and until a smooth liquid soap is produced, which generally takes about half an hour. Then very slowly stir into the liquid soap mixture 8½ quarts of commercial cresol. This gives a clear dark-brown fluid which will mix with water in any proportion. For most work a 5 per cent solution with water is used, or about 12 tablespoonfuls to a gallon of water when mixed in small quantities; (3) dissolve one-half pound of hard soap in 1 gallon of water by gently boiling, then add 2 gallons of kerosene and stir vigorously. To use, dilute with water to 20 gallons, or mix one part of the emulsion with six parts of water;

(4) lime sulphur solution to the strength used for dormant spraying.

For harvest mites (*Trombidium*): to prevent fowls from becoming infested, fowls of sulphur dusted among the feathers is recommended. Infested fowls may be treated with a feather dipped in petroleum or benzine and touched to the nodules on which the young mites are fixed. Sunshine seems detrimental to the pest. In infested localities it is advisable to confine the young chicks to runs kept free from weeds and tall grass.

For the scaly leg mite (*Cnemidocoptes mutans*): loosen the crusts which form on the legs and feet by soaking in warm water for several minutes, remove the scales. After the diseased surface is dried, an acaricide or mite killer is applied. The following give the best results: (1) oil of caraway, 1 part, and lard or vaseline 4 parts; (2) sulphur ointment composed of 1 dram flowers of sulphur, 20 grains carbonate of potash, $\frac{1}{2}$ ounce lard or vaseline; (3) 1 part of kerosene, 2 parts of raw linseed oil.

For the depluming mite (*Cnemidocoptes laevis* var. *gallinae*): (1) oil of caraway 1 part, and lard or vaseline 2 parts; (2) balsam of Peru; (3) Salmon's ointment; (4) crude oil or a reliable coal tar.

For the stick-tight, or southern chicken flea (*Echidnophaga gallinacea*): cleaning and disinfection of the poultry house; keep dogs and cats and wild animals away from the poultry houses, for they spread fleas; scatter salt freely about the chicken house and wet the soil thoroughly; water should be sprinkled two or three times a week, making further breeding impossible. Direct treatment is not always successful. The following is advised: kerosene 1 part, to 2 parts of lard applied to the infested regions only.

For the European hen flea (*Ceratophyllus avium*) the same remedies as for the poultry mite and bird mite.

For the bedbugs (*Acanthia*): burning sulphur in the chicken house is effective if done thoroughly in an air-tight house; (2) a mixture of one-third gasoline and two-thirds coal oil applied with a spray pump; (3) the remedies for mites.

349—Turkey Raising in the United States.—

WEIANT, A. S., in *U.S. Department of Agriculture, Farmers' Bulletin* 791, 26 pp. Washington, March, 1917.

A guide for turkey growers, treating of the following points: State of the turkey raising industry, profits, breeds, care and management, natural and artificial incubation, fattening, marketing, and diseases.

For many reasons the number of turkeys in the United States is continually diminishing. There was a decrease from 6,594,695 in 1900 to 3,688,708 in 1910, and poultry dealers state that the numbers are still decreasing. The chief reason is the increase of the rural population causing a large decrease in the pasture lands on which turkeys were raised. Other reasons are the

losses of young turkeys from disease, chiefly blackhead, and the heavy losses from beasts of prey in some States.

The wild turkey once numerous over most of North America is now found in the less inhabited districts chiefly in the mountain regions of Texas, New Mexico and Arizona and in the vast swamps bordering on the Gulf of Mexico. The principal domestic varieties are the Bronze, White Holland, Bourbon Red, Black, Narrangansett and Slate.

The rations most used for young turkeys are: (1) eggs finely cut up and corn bread crumbs during the first week, then whole wheat or hulled oats; (2) for the first few days dry bread soaked in milk, later dry bread crumbs, and when the turkeys are a little older, ordinary feed for chickens; (3) curdled milk, seasoned with pepper and salt, and corn bread crumbs; (4) in equal parts, oats (small grains) whole wheat, crushed corn; (5) crushed wheat; (6) bread made of 3 parts corn meal and 1 part wheat flour; (7) bran or coarse flour 2 parts, crushed sorghum 1 part, wheat, and hulled oats 1 part. Skim milk and whey are often added to the rations with excellent results. An excellent green feed is procured by cutting up together onion stems, lettuce leaves, dandelion leaves and alfalfa.

FARM ENGINEERING

354—The Tractor Industry in the United States.—FAWCETT, W., in *Farm Implement News*, p. 18. Chicago. November 14, 1918.

The Federal Department of Agriculture has completed an investigation of 240 establishments engaged in the manufacture of tractors. Of these 40 were hardly under way in their work, the figures given, therefore, represent the work of some 200 factories.

In 1916, there were 29,670 tractors constructed in the United States, in 1917, 62,742, and in the first 6 months of 1918, 58,543. In 1917, 49,504 tractors were sold in the United States and 14,854 were exported. In the first half of 1918, 15,610 were exported.

357—The "Cestro" Disc Harrow.—*The Implement and Machinery Review*, London, Nov., 1918, p. 757.

An improved disc harrow has been brought out by Messrs. J. W. Proctor & Co., Ltd., Cestro Works, Chesterfield, the object of the improvements being to provide an easy, quick and efficient method of controlling the cultivating depth and preparing the machine for transport. These advantages are secured by one and the same means. Arranged behind the machine and at right angles from the line of draught is the trailing axle with a transport wheel at each end. On the inner side of these wheels are vertical racks with holes in them spaced to lock with cotter pins to the two rear corners of the main frame in any position desired. In the centre of this

axle is a vertical toothed rack, upon which a pinion wheel moves up and down, and this pinion in turn is revolved by means of a worm wheel with a handle attached. By moving the locking cotter pins and turning the handle the transport wheels may be set to suit the depth required, thus enabling the operator to put any desired amount of sweep upon the discs, and at the same time to prevent the discs going too deeply or unevenly into the soil, thereby making it possible to get a fine and even seed bed. A few turns of the handle raise the discs from the ground and render the machine ready for transport.

The main frame, which is rectangular and constructed of angle iron, is bolted to the backbone of the machine, and is designed to carry the discs, which are slung through it, giving great rigidity to the whole machine, which is specially designed to meet the requirements of the farmer with only two horses and having more or less hilly land to work. By setting the discs the full depth when going down the field and raising the discs to within two or three inches below the surface in going up the field (at the same time keeping a good sweep upon the discs) the operator is enabled to trim and finish the seed bed on his way up. This feature will be specially appreciated by the farmer working a hillside field, and whose horses are not very robust, as it considerably lightens the work. Furthermore, the device for controlling the depth prevents the machine from throwing up deep furrows, although the sweep upon the discs may be considerable, its tendency being rather to sweep the high places into the hollow ones.

361.—The Future for Agricultural Implements in Syria.—*The Engineer*. London, Nov. 22, 1918, pp. 429-430.

A study made by the Special Commissioner in the Near East on the nature and importance of the markets open to British industry in Syria.

Agriculture in Syria may become of considerable importance, but it will first be necessary to construct extensive irrigation works to combat the frequent droughts. Shortly before the war the Turkish Government had in view a great irrigation project to be carried out by an English company, the cost of which was estimated at from 90 to 100 million dollars.

A very small proportion of the cultivable land of Syria has been touched by the plough. The great plains of Alep, Damas, Hama, Homs and Hauran, as well as the regions further south as far as Gaza, are scarcely cultivated at all, and then only after the most primitive fashion. Modern Agricultural methods are unknown. The Government has attempted to introduce agricultural implements by installing depots at different centres where implements are demonstrated. These machines have hitherto been either from America or Germany. To appeal to the Syrian farmer ploughs were exhibited resembling the native ploughs as much as possible and of easy construction and low

price. Pumps of different kinds were also demonstrated, most of them, of English make. Hand pumps are most in demand.

AGRICULTURAL INDUSTRIES.

371.—Rules for the Production of Sanitary Milk.—NICHOLLS, W. D., in *Kentucky Agricultural Experiment Station, Bulletin* No. 206, 44 pp. Lexington, Ky., March, 1917.

The bulletin analysed consists of two parts. Part I. treats of the practical means of controlling bacterial infection of milk, such as clean healthy cows, a barn built so as to be easily kept and sanitary, a clean barnyard, clean healthy milkers, clean and sanitary vessels, clean, wholesome feed, an ample and pure water supply for the cows and the dairy, clean methods in draining the milk and care in excluding dirt and bacteria, prompt and thorough cooling of the milk and a sanitary and conveniently located milk room.

The second part of the bulletin describes the experiments made by the author with a view to determining the number of bacteria to which milk is subjected during the various daily operations in the dairy barn and milk room, and to determine the best means of preventing bacterial contamination. The results were obtained by exposing, in the barn of the station and in the annexed dairy, glass petri dishes containing a sterile nutrient medium.

The results show that in a well cleaned dairy barn, very few bacteria are present in the air, but when dust is present the number is very large. When cows are in the barn the number of bacteria is materially increased. The presence of bedding in the stable greatly increases the bacteria of the air, and dusty mill feeds and hay are fruitful sources of bacterial contamination. The act of brushing the cows adds myriads of bacteria to the surrounding atmosphere. Washing the cows' udders, even when apparently clean, greatly reduces the number of bacteria falling from the udder.

The air in a pasture upon which is growing a heavy sod of grass is nearly sterile. In a dairy room having smooth walls and a concrete floor which are regularly and carefully washed, the air should be practically free from bacteria.

Conclusions.—To keep down the bacterial contamination of the air in the stable where the cows are milked, the room must be kept well cleaned and every effort must be made to keep down all dust. Dusty bedding must be avoided and, if bedding is used, dust should be laid by sprinkling.

Since cow hairs are laden with bacteria, all loose hairs should be removed from the cows by currying, in order to prevent them from falling into the milk. However, sufficient time should elapse after currying to permit the dust and bacteria to settle to the floor, before milking begins. The cows' udders should be carefully washed with tepid water and a clean cloth before milking begins.

Wiping the udder with a clean, damp cloth greatly reduces bacterial contamination of the milk. In feeding mill feeds and hay, care should be taken to raise as little dust as possible.

Extensive experiments reported in Bulletin 365 of the New York (Geneva) Experiment Station show that extreme refinement in the finish of the interior of the stable has no appreciable effect in reducing the bacterial contamination of milk and that the cleanliness of the stable, as affecting the bacterial content of the milk, has been over-estimated. Bulletin 409 of the Geneva Station shows that the presence of dust in the stable air has been over-estimated as a factor in bacterial contamination and that the prime factors in preventing contamination are, first, exclusion of dandruff, cow hairs and other foreign material during the actual milking process, by clean methods and by the use of a pail having a small opening; and, second, the thorough sterilization of pails and other utensils coming in contact with milk and the protection of these utensils from contamination previous to use.

372—Composition of Buffalo Milk.—TARTLER G. in *Zeitschrift für Fleisch- und Milchhygiene*, Berlin, Sept., 1918, pp. 327-329.

The author recommends the raising of buffaloes as dairy animals, on account of the nutritive value of their milk, as well as their resistance to tuberculosis. This immunity of buffaloes to tuberculosis renders their milk particularly suitable to consumptives. Buffalo milk has higher percentages of fat and albuminoids than cows' milk; this is true also for calcium and phosphoric acid content. Analyses of buffalo milk made by the author show: specific gravity 1.0333, water 81.94 per cent, dry matter 18.04, fats 9.07, total albuminoids 4.42, casein 3.54, albumen and globulin 0.50, lactose 5.19, ash 0.883. The ash contains: potash 13.33 per cent, sodium 8.17, lime 33.51, magnesia 3.75, chlorine 9.19, phosphoric anhydride 33.50.

The author reminds that buffalo meat is more rich in iron than is beef, and that it makes excellent building food for convalescents.

378—Saving Beans and Peas for Food and Seeding Purposes.—HELYAR, J. P., in *New Jersey Agricultural Experiment Station Circular* 86, 4 p., New Brunswick, N.J., August, 1917.

A circular describing methods of harvesting, curing, threshing and cleaning beans and peas, storage conditions, treatment for weevils (carbon bisulphide is said to be the best remedy), testing of seeds for germination ability, and home drying of beans and peas for food.

511—Value of a Small Plot of Ground to the Labouring Man.—FUNK, W. C., in *U.S. Department of Agriculture, Bulletin* No. 602, 10 pp., Washington, March 5, 1918.

A large acreage of land in the United States can be used for agricultural purposes

which is not generally classed as farm land. This area includes the numberless backyards and small holdings of less than 3 acres within and close by cities and villages. Much of this land is already being used for raising food for home consumption, but more is lying idle. The last census reported over 1,000,000 cows and as many pigs not on farms, which indicates that much milk, butter, and pork is produced by village and city families for home consumption.

In the Southern States the textile companies furnish homes for their employees. The mill buildings, surrounded by the operators' houses and the few necessary stores and shop buildings constitute the mill village. The bulletin here summarized estimates the amount of food produced by the mill workmen, basing its statement on records taken of 548 gardens, 165 poultry flocks, 74 cows, and 62 hogs.

The average area devoted to gardens by all families visited is 723 square yards, or 0.15 of an acre, and the average value of vegetables raised was \$29.87. The average size of the 165 poultry flocks from which the records were taken was 13.2 fowls; the number of eggs used and sold numbered 86 dozen, valued at \$19.35, and the number of fowls used and sold was 36, valued at \$11.07, giving a total income of \$30.42 per flock; the total average expenditure was \$16.22 per flock. The average purchase price of pigs was \$6.34, and the average live weight at killing time was 270 pounds, worth \$24.30; the cost of feed amounted to \$12.12, leaving a net return of \$5.84 after deducting the purchase price. The average value of the production of a cow was \$119 and the expenditure \$80.49.

513—The Relation of Size of Dairy to Economy in Milk Production in Delaware.—HOPKINS, J. A., in *Delaware College Agricultural Experiment Station Bulletin* 118, 50 pp., Newark, Delaware, Jan., 1918.

A study to determine what correlation, if any, exists between the size of dairies operating under given conditions and their profitableness as indicated by profit per cow per year, cost per quart of milk and profit per quart.

The investigation, made in 1916, covered 87 dairies in northern Delaware and southeastern Pennsylvania. These dairies were divided into 9 classes according to the number of cows in a dairy. In Class 1 there were under 10 cows in each dairy, and in Class 9 there were 75 to 100. In the bulletin summarized the data collected have been given in detail in a series of tables taking up each class separately. The following table contains a recapitulation of some of the results obtained.

The superior productiveness of larger dairies was found to be caused, in part at least, by the better type of cows that they kept. The cost per cow for hauling milk decreased as size of dairy increased up to 40 cows, then increased slightly, as the addition of another horse became necessary, then decreased again as the size of the dairy

increased. The amount of labour required per cow decreased as size of dairy increased until the dairy reached the size of 20 cows, then remained practically constant for dairies producing like grades of milk. Measured by profit, the efficiency of the dairies increased

with their size, with the exception of class II, which was the least profitable class. The larger dairies produced a higher grade of product than the smaller ones and disposed of it at a higher and better price.

Number of cows per dairy.	Number of dairies considered	Annual average production per cow	Cost of feed and pasture per cow	Cost of labour per cow	Total cost of maintenance per cow	Cost per quart of milk	Price received per quart of milk	Total income per cow
		quarts	\$	\$	\$	Cents	Cents	\$
Less than 10. . .	10	2,044	92.23	27.46	163.91	7.7	5.2	120.46
10-15	11	1,873	94.48	19.20	158.36	8.4	4.4	101.53
15-20	10	2,326	81.39	25.82	151.79	6.4	4.6	127.42
20-25	11	2,375	86.88	23.54	159.40	6.5	5.3	136.32
25-30	9	2,935	90.20	27.23	167.52	5.5	5.7	174.41
30-40	10	2,939	81.78	22.71	145.18	5.2	4.9	140.62
40-50	8	2,891	80.35	23.02	150.43	4.7	4.6	149.64
50-75	8	3,018	90.81	24.28	164.80	5.2	5.2	165.04
75-100	9	3,475	97.57	48.96	218.44	5.9	7.2	259.54

PLANT DISEASES.

381—Blackheart and the Aeration of Potatoes in Storage.—STEWART, F. C., and MIX, A. J., in *New York Agricultural Experiment Station, Geneva, N.Y., Bulletin No. 436*, pp. 321-362. 1917.

Present knowledge of blackheart in potatoes rests upon investigations made by Bartholomew who proved that it may result from exposure of the tubers to a temperature of 100-113°F., for 14-48 hours and is due to changes in the tissues caused by a derangement of the process of respiration. The accidental discovery that by excluding the air from potatoes blackheart may be produced at temperatures much lower than those employed by Bartholomew led the authors to make experiments to determine the relation between the air supply and blackheart, and the effect of storing potatoes in deep piles in cellars and bins and in unventilated pits and piles out of doors. Most of the experiments were made with sound tubers thoroughly washed and wiped dry, placed in wide mouthed glass jars having a capacity of about 3.5 quarts and provided with stoppers made air-tight. For the effect of storing potatoes in deep piles use was made of tall, galvanized-iron cylinders which were open at the top but air-tight on the sides and bottom.

One experiment was made out-of-doors with piles of potatoes which were protected from freezing by covering them with oat-straw and soil according to the usual custom. The highest and lowest temperatures employed were about 75 and 35°F. The experiments were conducted during April and May, 1914, from January to May, 1915, and from October 1915 to May 1916. A single variety of potato, Sir Walter Raleigh, was used throughout.

The results of this investigation emphasize the importance of providing ventilation for potatoes in storage. The need of ventilation depends very largely upon the temperature. As the temperature rises the volume of air required increases rapidly. At low temperatures, potatoes may be stored in deep

piles for long periods of time. At high temperatures, it is necessary to avoid deep piling or else provide special means of ventilation. If the temperature is kept below 40°F. potatoes may be piled in bins and cellars to a depth of six feet without any ventilation except that provided through free access to the air overhead. Under such conditions, potatoes may be stored with safety for at least six months and perhaps longer. It is probable that no harm will result if the temperature goes up to 45°F. for a few days. But a long period of storage followed by a two weeks' exposure to a temperature of 50°F. or higher is likely to result in the ruin of most of the tubers below a depth of about three feet. Potatoes stored in deep piles should be carefully watched in the spring as the temperature rises. A few days of high temperature may cause much loss.

Potatoes stored at high temperatures require more ventilation than those stored at low temperatures.

Better ventilation is required for potatoes which are to be kept stored for a long period than those which are to be stored for only a short time.

Until more accurate determinations are made, six feet should be regarded as the maximum depth to which potatoes may be piled without special provision for ventilation when stored for six months at temperatures below 45°F. If greater depths than six feet are employed ventilators should be provided and so arranged that none of the tubers will be more than six feet distant from an abundant supply of air.

At temperatures of 50-70°F. potatoes should not be piled over three feet deep if they are to be kept longer than about three weeks. No kind of ventilation is sufficient to prevent the occurrence of blackheart in potatoes kept for even a few days continuously at a temperature above 100°F. Complete exclusion of the air will ruin potatoes at any temperature. Small potato pits do not need ventilation; but some provision should be made for the ventilation of large pits.

AGRICULTURAL ECONOMICS

NATIONAL CONGRESS OF RURAL BANKS IN ITALY

A National Congress of Rural Banks, in which more than 1,300 banks took part, was held in Rome in September, 1918.

The first subject with which the congress dealt was "the principles of the organization" of rural co-operation for purposes of credit. With reference thereto a long resolution, containing a whole programme for the internal organization of the movement, was approved. The mover championed an organization based on local federations which would be centres whence small rural credit would receive an impulse and be co-ordinated. Without their aid the single banks, operating in the narrow field of one village, could not have either the capacity, the initiative or the membership necessary to regular and effective working. Therefore no rural bank ought to remain isolated, and it was resolved to circulate as widely as possible from 30th June, 1919, onwards the lists of the rural banks organized in federations, in order that the public might thus be able to know which banks were guaranteed by their specialized and technical organization and which preferred to remain in a very dangerous isolation. Energetic measures were taken to ensure to the local federations, the staff and technical and financial resources necessary to their regular and active working. The federations are particularly vigilant that transgressions of rules or irregularities do not occur on any pretext, either on the administrative side, in that credits are opened, otherwise than the rules allow, for non-members or public or private bodies, or for members on a scale or for purposes outside the limits fixed by the meetings or inconsistent with the character of the rural banks, or on the technical and bookkeeping side affecting the keeping of the obligatory books and documents and the production of these upon occasion.

Serious and drastic steps are taken against rural banks which will not follow the instructions of the local federation. All means are used to counteract any tendency which may show itself in banks to speculate; the separation of credit from every other form of business is promoted, and specific duties and responsibilities are distributed by the institution of new societies, better fitted to develop and carry on new activities, so that these are not confused with the affording of credit, the proper business of rural banks. When advisable, the adoption of a uniform set of rules, which can be modified to suit particular local needs, is advocated, and a technical staff, capable of directing and managing the societies, is formed by means of special courses in bookkeeping. The congress also examines the relations which should be established with the local banks: it was

decided that the rural banks should preferably be supported by banks belonging to the Italian Banking Federation, and that the federations should examine methods by which the work of the rural banks could gradually be done by representatives and agents of the banks of the Italian Banking Federation within the limits of their competency. Thus the cycle of the organization of credit could be completed and most useful services could be rendered to the agricultural population. A local federation would, however, be most active in conducting periodical and extraordinary inspections, which would cover the whole work of the societies and ought to be most rigorous. The congress decided that the local federations might promote the dissolution and liquidation of banks which had not technical and economic resources sufficient to allow of their regular existence or activity or which did not attain the ends set before them.

The nature and working of a rural bank were also examined, and it was agreed to recognize it as a rural co-operative society, aiming at raising the condition of its members, morally, economically and socially, facilitating and promoting their isolated and associated action by means of a right use of credit, and gradually taking the place, within its limited sphere of activity, of a centre of social life. It is not therefore mechanical credit business but a scientific realization of the value of accumulated savings it behooves a bank to promote. To quote from the inaugural speech at the congress: "Once when usury ate into and gangrened the life of small country places, a rural bank could discharge a duty of economic improvement which was morally productive, even if it did not more than provide a till where deposits were received and whence loans could be made. But nowadays, a rural bank which lives enclosed by the limits of its own tiny accounts and does not perceive the movement of rural changes which is taking place round about it, is inconceivable. The rural bank is acquiring consciousness of the position it occupies within the great framework of credit organization and the yet greater framework of national economy.

A second resolution held that the rural banks should promote and encourage the formation of these family properties which tend to preserve and make more numerous small holdings, and which in many cases represent the system of land distribution most adapted to the needs of intensive agriculture. The rural banks should also promote and support special enterprises for the purchase of agricultural machinery, selected seeds, manures and fertilizers. They should prepare to undertake, with the fit machinery, the work necessary to ensuring that soldiers who return to agriculture may derive the greatest advantage from the use made of the

ex-soldiers' insurance policies. They should also consider the problem of making the settler as valuable as possible, either by giving him technical or social assistance, or by giving him other needed help, or by taking opportune local initiative. He should thus become, especially if he belong to the class of small leaseholders and permanently employed farm labourers, a skilled workman. In view of the new duties of mutual associations, especially in the matter of the insurance of societies, the members of rural banks should constitute nuclei for the promotion and propagation of the new forms of thrift. In fact, the banks should be local centres for giving an impulse to and stimulating all the best energies, and without losing their own character or altering their functions as bodies affording small rural credit, they should provoke and support initiative and enterprise which are to the advantage of production.

The question most lengthily and animatedly discussed in the congress was that of the technical form which a rural bank should have when it discharges these vast duties. Two tendencies were in conflict: the first would have maintained the traditional character of a rural bank, a small institution affording credit to members in its village; the other took into consideration the complex duties assigned to a rural bank, and aspired to extending its means of action, beyond the sphere now granted by the rules, by means of various forms of financing it and of granting credit. The solution adopted maintained in their general outline the criteria previously followed, which were founded on the principle of affording only individual credit to single members, but granted larger powers of supervision and assistance to the local federations.

Finally the theme was developed of legislative reforms which would concern agricul-

tural co-operation. Under the name of co-operative societies Italian law regulates only societies having a variable capital, and hence grave practical difficulties arise in the matter of approving rules and applying various laws, and also in connection with taxation. The congress affirmed the necessity for a distinction between a company having a variable capital and a co-operative society, and recommended that the legal form of the latter be made to correspond to its economic significance. The congress declared what were in its opinion, the characteristics of true co-operation. The business of an ordinary company is conducted by a group of capitalists who aim at the maximum profit, the business of a co-operative society by a group whose interest in production differs from that of the capitalists, being the interest of labourers, consumers, persons needing credit, etc. Therefore in a co-operative society capital is remunerated merely at the ordinary rate of interest, and any remaining net profit is distributed among the co-operators in proportion to their labour, consumption, recourse to credit, etc. Thus co-operation determines the profit accruing to capital on a basis of justice. Besides this distributive function co-operation also has a productive function, especially in the case of agriculture, inasmuch as the co-operative is economically the most convenient form of organizing the forces applied to the agricultural industry. Such was the conception of co-operation which the congress affirmed.

The personal character of the right to the vote and membership, and the limitation of the dividend to the current rate of interest are, according to the dicta of the congress, those economic characteristics of a co-operative society which the legislature should translate into legal characteristics.

CONTENTS OF THE INSTITUTE ECONOMIC BULLETIN

In addition to those already dealt with herein, the following is a list of the more important subjects treated in the May number of the International Review of Agricultural Economics. Persons interested in any of the articles in this list may obtain the original bulletin on application to the Institute Branch, so long as the supply for distribution is not exhausted.

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Agricultural Co-operation in Nebraska	257-260
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AGRICULTURAL STATISTICS

CROPS OF THE YEAR 1918-19 IN THE SOUTHERN HEMISPHERE

Countries	Area			Production		
	1918-19	1917-18	Five years' average 1912-13 to 1916-17	1918-19	1917-18	Five years' average 1912-13 to 1916-17
	acres	acres	acres	bushels	bushels	bushels
WHEAT:						
Argentina,	16,976,000	17,875,000	16,264,000	184,270,000	223,639,000	142,086,000
South Africa . . .	953,000	925,000	743,000	8,600,000	8,833,000	6,175,000
Australia	8,649,000	9,678,000	10,058,000	80,836,000	114,867,000	110,387,000
New Zealand, . . .	221,000	281,000	219,000	6,265,000	6,807,000	5,834,000
Totals.	26,799,000	28,759,000	27,284,000	279,971,000	354,146,000	264,482,000
OATS:						
Argentina	2,980,000	3,200,000	2,965,000	41,525,000	64,599,000	51,816,000
Zew Zealand . . .	147,000	156,000	285,000	5,896,000	5,670,000	12,112,000
CORN:						
South Africa . . .	2,950,000	3,300,000	2,652,000	34,642,000	34,285,000	33,616,000
FLAXSEED:						
Argentina	3,417,000	3,229,000	4,029,000	27,755,000	19,589,000	33,138,000

FOREIGN CROP REPORTS

(From Broomhall's Corn Trade News)

United Kingdom.—According to cable advices just received, much wheat has been cut and a fair quantity has already been stacked. The quality is reported quite favourable. Cutting of winter oats and barley has made good progress.

France.—It is expected that the outturn of both wheat and rye will likely be better than was earlier anticipated, although the yields will be below those of last year. Many complaints of oats are being received. Potatoes and forage crops have made a splendid recovery and now show excellent condition. General estimates make the wheat crop one-third less than last year.

Italy.—Wheat harvesting has made good progress and crop estimates are unchanged. The official prices for the 1920 crop of wheat have been fixed at 70 to 80 shillings per quintal, or 220 pounds, plus good premiums in the south and invaded districts. Light

rains have fallen, and the outlook for corn is now considered slightly better.

Spain.—Our Barcelona correspondent sends a very favourable report of the wheat crop being harvested. Wheat and barley prices are somewhat easier.

North Africa.—Harvest favoured with generally good weather. The wheat crop is variable in quantity, but good in quality. Barley appears to be a full crop.

Denmark.—Crops in this country are reported mostly over average.

Germany.—From the south we receive good reports of economic conditions, but elsewhere advices are most contradictory. Newspapers state that harvest prospects for cereals continue satisfactory. Good results are expected from both rye and wheat, while spring cereals have steadily improved so that average results are anticipated. Potatoes and roots, so far, show very good condition.

UNITED STATES AUGUST CROP REPORT

The August report of the Department of Agriculture makes the amount of oats remaining on the farms on August 1 about 6 per cent of last year's crop, or about 92,508,000 bushels, compared with 81,424,000

last year, and 76,710,000 bushels the average for the five years—1913-18.

The estimated condition and yields of the principal crops were as follows:—

	Condition August 1919	Aggregate yield 1919	Yield 1918
		bushels	bushels
Winter wheat.....		715,000,000	558,449,000
Spring wheat.....	53.9	225,000,000	358,651,000
All wheat.....		940,000,000	917,100,000
Corn.....	81.7	2,788,000,000	2,582,814,000
Oats.....	76.5	1,266,000,000	1,538,359,000
Rye.....		84,600,000	89,103,000
Barley.....	73.6	204,000,000	256,375,000
Potatoes.....		357,000,000	397,676,000
Flax.....	52.7	10,200,000	14,617,000
All hay, tons.....	91.0	111,000,000	89,833,000

IMPORTS AND EXPORTS OF WHEAT AND FLOUR

(Flour expressed in equivalent quantities of wheat)
(Thousands of Bushels)

Countries	Imports				Exports			
	April		First four months		April		First four months	
	1919	1918	1919	1918	1919	1918	1919	1918
Denmark.....		45	83	162	40		430	3
Great Britain and Ireland.....	9,961	17,502	40,551	48,029	18	32	133	131
Italy.....	5,831	5,453	23,773	18,929	73	31	381	91
Sweden.....	127		853				55	
Canada.....	6	7	19	23	6,613	11,074	27,691	42,640
India.....	3,920	66	5,982	69	108	2,219	262	7,268
Japan.....	1,727	49	2,164	83		675		2,339
Egypt.....	20	35	571	143		5		58
Tunis.....	2		5		943	63	1,436	105

LIVE STOCK STATISTICS

NETHERLANDS

Numbers of live stock in the Netherlands according to the Census of March, 1919, as compared with that of June, 1910.

Classification	Number on		Increase (+) or decrease (—)	
	March 1919	June 1910	Differences	Percentage
Horses.....	362,011	327,377	+ 34,634	+ 10.6
Milch cows.....	1,232,264	1,068,361	+ 163,903	+ 15.3
Other cattle.....	736,345	958,582	— 222,237	— 25.1
Sheep.....	437,075	889,036	— 451,961	— 50.8
Pigs.....	449,829	1,259,844	— 810,015	— 64.3

PRUSSIA

	March 1, 1919	March 1, 1918		
Cattle.....	9,098,302	10,229,703	— 1,131,401	— 11.1
Pigs.....	4,644,068	3,308,108	+ 1,335,966	+ 40.4

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DEPARTMENT OF AGRICULTURE

The Agricultural Gazette of Canada

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ALLOTMENTS UNDER THE AGRICULTURAL INSTRUCTION ACT

THE agreements, entered into with the provinces of Canada, to define the purposes for which the grants for 1919-20, made under The Agricultural Instruction Act, are to be expended, have been completed, with the exception of the agreement with British Columbia, which is still in abeyance.

The total grant for the year, as provided by the Act, amounts to \$1,100,000. Below will be found detailed statements of the proposed expenditure of this sum by the provinces, these schedules being embodied in the several agreements.

A brief summary of the subdivisions under which the grant is to be expended and the total sum allotted to each is as follows:—

Agricultural colleges and schools.	\$ 291,701 16
Instruction and demonstration.	597,712 68
Women's work	31,510 00
Elementary agricultural education.	154,076 16
Veterinary colleges.	25,000 00

\$ 1,100,000 00

While the above constitute the main divisions under which the grant is allocated, a summary of this kind is necessarily arbitrary. Because of the differences of procedure in different provinces, the fields of work, and consequently the allotments, are inter-related in various ways. Particularly between the divisions "agricultural colleges" and "instruction and demonstration" is it difficult to make a clear distinction. For example, the sum set aside for "agricultural colleges and schools" is not expended in all cases for the exclusive benefit of those institutions, but has a far more extended application. Thus it will be found that the contribution to such institutions is used not only in strengthening the staffs of teachers, and to meet the cost of research work and special investigations into agricultural affairs; it is also used in some instances to provide additional building accommodation and equipment, or to establish schools of agriculture, such as that at Kemptville, Ontario; to aid the agricultural schools in Alberta, and to carry on special courses and extension work generally both among children and adults. From this it will be realized that a part of the allotment is used in promoting work of an instructional and demonstrational character, usually referred to as college extension, so that part of the allotment belongs, strictly speaking, to the "instruction and demonstration" division of the grant.

The colleges and schools benefiting from the grant are the Ontario Agricultural College, Guelph; the agricultural school at Kemptville, Ontario; the Macdonald College and the schools of agriculture at Oka and Ste. Anne de la Pocatière in the the province of Quebec; the college of agriculture of the University of Saskatchewan; the agricultural schools at Claresholm, Olds, and Vermilion in the province of Alberta, and the college of agriculture in the province of British Columbia.

The allotment for "instruction and demonstration" bears either the whole or a large proportion of the cost of maintaining the agricultural representatives and their offices. These are the local resident agents of the provincial agricultural departments, and usually their work is related to most of the departmental activities which are not administrative in character. Among the customary activities of these officers may be included short courses, boys' and girls' clubs, school fairs, and many other undertakings. In addition, the instruction and demonstration item includes special propaganda, undertaken by agricultural departments, for the promotion of better farming, demonstrations in fruit-growing, poultry and bee-keeping, co-operative marketing, field husbandry, dairying and live stock.

"Women's Work," which includes, household science, hygiene, home-making, dressmaking, and home nursing, is assisted in the majority of the provinces through the women's institutes or equivalent organizations. Besides the supervision of these organizations, lecturers and demonstrators attend gatherings of

women from rural communities and spread among them a knowledge of better methods for the conduct of domestic affairs, work that might also come under the general classification of "instruction and demonstration."

The allotment to "elementary agricultural education" is employed in various ways to extend agricultural teaching in the rural schools. It also assists in the very necessary function of enabling teachers to qualify for giving such forms of instruction. It is employed in connection with the school and home garden and school fair movement, and in some instances promotes the teaching of agriculture and household science, including cooking and sewing, in high schools, collegiate institutes and similar institutions, from whence the supply of teachers is drawn for the rural community.

The allotment to veterinary colleges is for the purpose of assisting institutions qualifying young men for the veterinary profession. Two such institutions participate, the Ontario Veterinary College, and the School of Veterinary Science at Montreal.

The above will serve to indicate briefly the wide range of work by means of which *The Agricultural Instruction Act* assists in promoting the welfare of that portion of the community which is associated with the country's greatest basic industry—Agriculture. A more comprehensive review will be found in the annual report on *The Agricultural Instruction Act*, a copy of which may be obtained on application to the Publications Branch, Department of Agriculture, Ottawa.

ALLOTMENTS.

PRINCE EDWARD ISLAND

Agricultural Buildings Equipment and maintenance.....	\$ 1,725 00
Director and agricultural representatives....	5,800 00
Short courses	300 00
Drainage and soils.....	1,300 00
Live stock and dairying.....	3,900 00
Poultry, horticulture, beekeeping and co-operative marketing.....	1,700 00

Women's institutes.....	3,510 00
Agricultural instruction in public and high schools, training of teachers, allowances, grants, maintenance of rural science department, Prince of Wales College.....	11,500 00
Contingencies including clerical assistance.....	2,014 22
	\$ 31,749 22

NOVA SCOTIA

COLLEGE OF AGRICULTURE:

1. Science building--interest and sinking fund.....	\$ 8,000 00
2. Salaries and maintenance.....	23,000 00

DEMONSTRATION AND INSTRUCTION:

3. Agricultural representatives.....	12,000 00
4. Short courses.....	1,000 00
5. Dairying.....	5,000 00
6. Poultry.....	1,500 00
7. Beekeeping.....	500 00
8. Drainage and soil survey.....	1,600 00
9. Soils and fertilizers.....	1,500 00
10. Field crops.....	1,500 00
11. Fruit growing.....	2,000 00
12. Women's work.....	2,500 00
13. Entomological work.....	9,000 00

ELEMENTARY AGRICULTURAL EDUCATION:

14. Agricultural instruction in public, high, and normal schools, teacher training, grants and allowances.....	10,000 00
15. School children's exhibits and competitions.....	2,000 00
16. Contingencies.....	616 69

\$ 81,716 69

NEW BRUNSWICK

1. Agricultural schools: salaries and maintenance.....	\$ 1,500 00
2. Agricultural representatives.....	12,000 00
3. Beekeeping.....	2,400 00
4. Soils and drainage.....	5,000 00
5. Horticulture.....	5,200 00
6. Live stock.....	4,500 00
7. Dairying.....	5,210 80
8. Poultry.....	3,800 00
9. Entomology.....	900 00
10. Agricultural societies.....	2,800 00
11. Women's institutes.....	6,000 00
12. Elementary agricultural education: agricultural instruction in public, high and normal schools, household science, teacher training, grants and allowances.....	14,800 00

\$ 64,110 80

QUEBEC

COLLEGES AND SCHOOLS OF AGRICULTURE:

1. Grants and allowances-- Macdonald College; school of agriculture, Ste. Anne de la Pocatière, Oka Agricultural Institute.....	\$ 75,000 00
2. School of veterinary science, building and extension.....	5,000 00

INSTRUCTION AND DEMONSTRATION:

3. Animal husbandry.....	9,000 00
4. Poultry husbandry.....	18,000 00
5. Horticultural and entomological work.....	31,000 00
6. Experimental and demonstration orchards.....	4,000 00
7. Dairying, educational work in cheese and butter-making.....	5,000 00
8. Agricultural representatives.....	69,000 00
9. Seed selection, clover plots and demonstrations.....	9,000 00

10. Beekeeping—educational work.....	7,000 00
11. Drainage.....	6,000 00
12. Maple industry—maintenance of schools and allowances to students..	4,000 00
13. Short courses and lectures.....	9,113 76

ELEMENTARY AGRICULTURAL EDUCATION:

14. To promote the teaching of agriculture in academies, rural and normal schools, teacher training, school gardens.....	8,000 00
15. To promote the teaching of domestic science in academies and normal schools—grants, lectures and inspection.....	10,000 00
16. School children's exhibits.....	2,000 00
	\$ 271,113 76

ONTARIO

AGRICULTURAL COLLEGES AND SCHOOLS:

1. Ontario Agricultural College:		
(a) Buildings, equipment and furnishings.....	\$ 40,000 00	
(b) Salaries and expenses, additions to staff maintenance.....	15,000 00	\$ 55,000 00
2. Agricultural School and Farm:		
(a) Capital expenditure.....	45,000 00	
(b) Maintenance, purchase of stock, machinery, repairs, services, expenses and equipment.....	15,000 00	60,000 00

INSTRUCTION AND DEMONSTRATION:

3. Agricultural representatives, including clerical and other assistance in connection with the administration.....	126,000 00
4. Extension work in household science in rural communities.....	1,500 00
5. Cooperation and markets, educational work in connection with the marketing of farm products including organization of co-operative societies ..	12,000 00
6. Demonstration and instruction in vegetable growing ..	12,000 00
7. Stock and seed judging short courses and institute lectures.....	2,000 00
8. Women's Institute work, including courses in cooking, sewing, etc.....	5,000 00
9. Short courses for fall fairs field crops and poultry judges, including travelling and living expenses ..	5,000 00
10. Lectures on horticulture.....	500 00
11. Demonstrations in growing and handling fruit ..	1,803 26
12. Demonstrations with vegetables and hardy fruits in New Ontario.....	4,000 00
13. Vineland Horticulture Experiment Station, experimental work ..	2,000 00
14. Demonstration work on soils ..	5,000 00
15. Beekeeping.....	1,000 00
16. Instruction and special educational work in growing and handling corn.....	3,500 00

ELEMENTARY AGRICULTURAL EDUCATION:

17. To encourage the teaching and organization of classes in agriculture; and of household science and manual training as applied to work on the farm. To provide for teaching, inspection, services and equipment in connection with such classes in high, public, separate, continuation and normal schools and in universities, in summer courses and other courses and educational gatherings; for travelling and living expenses in connection with short courses or other educational gatherings. To be available for grants to boards, teachers, and inspectors and to be paid on the recommendation of the Department of Education.....	40,000 00
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\$ 336,303 26

MANITOBA

Agricultural representatives.....	\$ 13,113 11
Soil analysis and survey.....	1,000 00
Dairy work.....	6,000 00
Poultry work.....	4,000 00
Boy's and girl's clubs.....	15,000 00
Extension schools.....	18,000 00
Home economics.....	13,000 00
Beckkeeping.....	2,000 00
Killarney demonstration farm.....	4,000 00
Contingencies and miscellaneous.....	1,000 00
	<hr/>
	\$ 77,113 11

SASKATCHEWAN

COLLEGE OF AGRICULTURE:

1. Staff salaries--research and extension service.....	\$ 21,476 16
2. Women's work--homemakers' clubs.....	5,500 00

INSTRUCTION AND DEMONSTRATION:

3. Co-operation and marketing.....	7,000 00
4. Animal husbandry.....	3,000 00
5. Dairying.....	3,000 00
6. Field husbandry.....	5,000 00
7. Demonstration trains.....	7,000 00
8. Agricultural representatives.....	1,476 16
9. Veterinary short course.....	500 00

ELEMENTARY AGRICULTURAL EDUCATION:

10. Agricultural instruction in public, high, and normal schools, household science; training of teachers; nature study.....	24,476 16
11. School fairs.....	2,500 00
12. Agricultural scholarships and post graduate course in agriculture...	800 00
	<hr/>
	\$ 81,728 48

ALBERTA

Schools of agriculture.....	\$ 38,000 00
Special work placing live stock on farms under live stock encouragement act ..	7,400 00
Women's work.....	9,000 00
Agricultural representatives.....	10,000 00
Poultry and egg marketing.....	2,500 00
Miscellaneous.....	65 62
	<hr/>
	\$ 66,965 62

THE WORK OF THE FORESTRY BRANCH OF THE DEPARTMENT OF THE INTERIOR IN RELATION TO AGRICULTURE

BY NORMAN M. ROSS, B.S.A., B.F., CHIEF OF THE TREE-PLANTING DIVISION, INDIAN HEAD

THE system under which the settlers of the prairies of Manitoba, Saskatchewan, and Alberta are assisted by the Forestry Branch of the Department of the Interior has now been in operation since the spring of 1901. Under this system any settler can secure from the Forestry Branch nurseries sufficient quantities of hardy trees suited

year during the same period has been 4,405. The species sent out in this way are: *Manitoba maple*, *green ash*, *caragana*, *Russian poplar*, and *Russian willow*.

In addition to these broad-leaved species evergreen conifers of *Scotch pine*, *jack pine*, *lodgepole pine*, and *white spruce* have been sent out in limited numbers since the spring of



GROWING WINDBREAKS ON THE PRAIRIES. SCOTCH PINE PLANTATION TWELVE YEARS OLD. DOMINION FOREST NURSERY STATION, INDIAN HEAD, SASK.

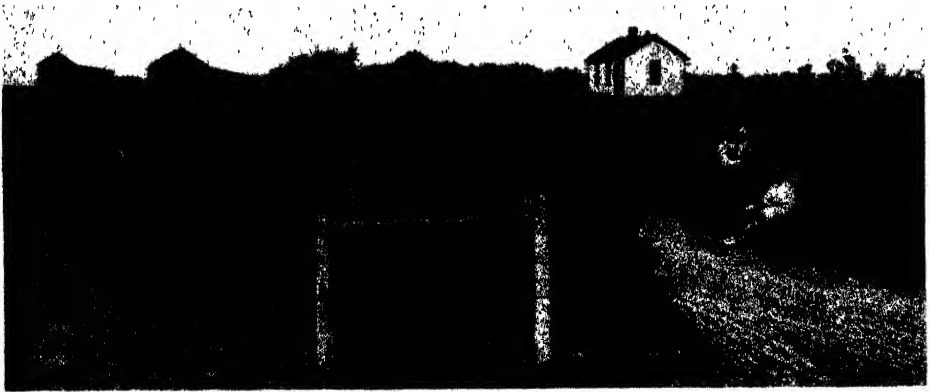
for prairie conditions to establish practical shelter-belts around his farm buildings and gardens. These trees are furnished free of charge. All the settler has to do is to properly summer-fallow the ground he wishes to plant the trees on and to agree to plant and care for the tree belts as instructed. Up to the present time 53,142,425 seedlings and cuttings have been supplied to farmers. The average distribution for the past five seasons has been 4,922,615 per year and the average number of individual shipments (practically the number of farmers to whom trees are sent) per

1912. These evergreens are sold at a nominal charge of \$1 per 100, which covers the cost of growing and handling in the nursery. Of these evergreens 933,000 have been distributed, 140,000 being about the average annual distribution at the present time. The evergreens appear to be particularly adapted to withstand the severe conditions of the prairies, and, when once established, will withstand periods of drought and heat that are often fatal to the broad-leaved species.

The stock supplied for the planting is all grown on the Forestry Branch

nurseries at Indian Head, Saskatchewan, and Sutherland, Saskatchewan, and is raised entirely from

in the neighbourhood of Portage la Prairie in Manitoba. The spruce and pine seed is collected on the



FARM OF A SASKATCHEWAN SETTLER A FEW YEARS AFTER STARTING. TREES SUPPLIED BY THE DOMINION FOREST NURSERY STATION, INDIAN HEAD, SASK. PHOTOGRAPH TAKEN IN 1919.



WINDBREAKS ON AN ALBERTA FARM SIX YEARS AFTER PLANTING. TREES SUPPLIED BY THE DOMINION FOREST NURSERY STATION, INDIAN HEAD, SASK.

seed collected in the West. Maple and ash seed is secured in the Qu'Appelle valley, Saskatchewan, or

Dominion forest reserves in Manitoba and Saskatchewan. Scotch pine planted on the Indian Head Nursery

in 1906 has been bearing fair crops of cones since 1916 and a sufficient supply of good seed is now obtainable from locally grown trees. The Russian poplars and willows are distributed as unrooted cuttings.

In addition to the trees and cuttings a very considerable amount of maple, ash, and caragana seed is sent out when a sufficient supply is available. It is a very easy matter to grow these three kinds from seed, and many farmers find it more convenient to raise their own seedlings than to have them sent directly

Department of Education is actively co-operating with the Forestry Branch in endeavouring to interest the trustees of the various schools, and all applications for trees for rural schools in the province are made through the Department of Education, the school inspectors undertaking to see that the ground is properly prepared and that as far as possible proper care of the trees is given after planting.

A very large number of bulletins are distributed each season, and recently Bulletin No. 1, "Tree-



TREE GROWTH ON THE PRAIRIES. SASKATCHEWAN FARM RESIDENCE IN 1918.
IN 1904 THIS LAND WAS BARE PRAIRIE.

from the nursery. This is especially the case where the farmer lives a long way from the railway with a poor mail service. Under such conditions a shipment of trees may remain at the express station for several days before notification reaches him and the chances are that the young plants may become heated or dried up before they can be set out.

Encouragement is also given to planting trees around rural schools, and considerable numbers of trees have been supplied for this purpose. In Saskatchewan the Provincial

Planting on the Prairies," has been published in revised form. Copies may be had free on application to the Forest Nursery Station, Indian Head, Saskatchewan.

On each of the Forestry Branch Nursery Stations a considerable portion of the grounds is planted out to ornamental shrubs, flowers, and lawns as a demonstration of results that may be secured under prairie conditions in the way of beautifying the farm grounds. No ornamental shrubs or flowers, however, are sent out from the nurseries.

SOLDIER SETTLEMENT BOARD**LIVE STOCK AND FARM MACHINERY FOR SETTLERS.**

THE Equipment Branch of the Soldier Settlement Board of Canada has for some time been assisting settlers in the purchase of live stock and farm implements. They have completed a survey of the live stock situation throughout the Dominion and have made arrangements to meet conditions in different parts of the country. To facilitate the purchase of horses the Board has assembled a sufficient number of animals in its stables at Winnipeg, Regina, Saskatoon, Prince Albert, and at the Calgary and Edmonton stockyards. At these points the settler has the opportunity of selecting his horses which are farm bred and in every way suitable for farm requirements. They are guaranteed by the Board as to soundness and each horse carries its selling price in plain figures. A good serviceable team may be secured at an average price of about \$350 and the settlers are protected from any unscrupulous dealers as well as being saved a considerable sum by purchasing in this manner. The head office for the stock purchasing agent in the western provinces is at Winnipeg and he has a deputy in each province. Any of these officials is ready at all times to assist the settler in all matters regarding live stock and in addition to this the Live Stock Branch of the Dominion Department of Agriculture is assisting the Board in an advisory capacity and is prepared to advise and aid the settlers in purchasing horses and other stock at the stock yards. In cases where the settler has an opportunity to purchase stock in his particular district provision has been made whereby such purchase will be protected by the supervision of an official of the Board.

In British Columbia, Ontario, and Eastern Canada it has not been found necessary at the present time to assemble stock at central points as

both horses and other stock are plentiful and within easy access to the settlers' land. Many of the settlers will take advantage of the auction sales held in their locality and in all such cases provision has been made that the purchasing of stock will be supervised by a competent live stock official.

FARM IMPLEMENTS.

An arrangement with a number of the leading agricultural implement firms in Canada by which soldier settlers on the land will be given an opportunity of purchasing implements, harness, and other necessary equipment at considerably reduced prices has been effected by the Soldier Settlement Board. The Board has endeavoured to get the settlers as wide a range of selection as practicable and the manufacturers have agreed to give the settlers participating in the benefits of the land settlement scheme full service in supplying spare parts and in making repairs. This is of first importance to the progressive farmer. The companies with which arrangements have been made have branch offices and large warehouses in many distributing centres and in addition they will have local agents at convenient points throughout the farming districts. The special prices offered by them on all implements, wagons, fencing, harness and building materials may be obtained on application to any office of the Soldier Settlement Board and upon requisition the goods handled will be supplied by their agents at special prices.

The Board sees no objection to settlers purchasing their requirements from other firms than those named but for their own protection it does not approve of settlers paying more for an article than the special price already arranged for. In case where settlers desire to purchase

articles of equipment elsewhere the Board exercises supervision over such transaction and endeavours to see that articles thus secured are of good value. The purchasing of second hand machinery and harness is not encouraged unless the purchaser has had experience and is sure of good value for his money. Instructions are issued to qualified settlers as to how they may expend their loan for stock and equipment. The district

agriculturist and the local representative is consulted in all cases. These officials advise the settler and discuss with him the number and kind of live stock he will require and also what implements are essential for the successful working of the farm in question. Owing to the exceptional high prices of implements et cetera it is to the settlers advantage to keep his equipment down to absolute essentials.

A SOLDIERS' MEMORIAL

There is a little Welsh settlement in Pennsylvania of about eight thousand people where the spirit of patriotism runs high. It set a goal for the 4th Liberty Loan of a million dollars and reached it. Since the war they decided to build a Soldiers' Memorial, as many cities and small towns all over are doing.

A town meeting was called to consider what form this memorial should take. Should it be a monument or a memorial house? The people decided by a large majority to build a memorial house, which should be a community centre. They planned that every man, woman and child should be a shareholder by making a subscription of 1, 2, 3, 4 or 5 cents a week for a period of 5 years, and with this amount they built a house costing \$125,000, containing an auditorium, recreation room, gymnasium and swimming pool.

It is proposed to make this the centre of the community life in every way. The auditorium will be for gatherings where public questions may be discussed and as the Welsh are very fond of music, they have planned to have community singing here, also lectures of all sorts. In the gymnasium dances of a better type will be held and all kinds of games indulged in. But most of all it is a place for the soldier, where he can gather with his comrades and recount the tales of war—tales that his listeners will never tire of hearing.

The house will be his, erected in his honour and because it is his and because he and his comrades are going to lead the community in the coming years, so more and more the community life will centre about the memorial house.

PART I

Dominion Department of Agriculture

THE EXPERIMENTAL FARMS

THE DIVISION OF BEES

SOME OF THE ACTIVITIES OF THE BEE DIVISION

BY F. W. L. SLADEN, APIARIST

THE keeping of bees at fifteen or sixteen of the Dominion Experimental Farms for a number of years now has demonstrated that bees can be kept and made profitable in practically every part of Canada. The returns vary with the sources of the honey and the weather. Alsike and white clover are the principal honey producing plants, but in parts of the dry regions of southern Alberta and southern British Columbia, alfalfa equals or excels them, and in northern Canada and parts of the Pacific Coast fireweed is of chief importance.

Reviewing the beekeeping industry in Canada, one is impressed with the vast quantity of nectar annually going to waste for want of bees to collect it. In the writer's opinion, this waste will not be remedied by advising every farmer to keep bees, but by working out ways in which those who are already beekeepers can manage a greater number of colonies than at present, bringing higher returns for the labour expended. If one could keep double the number of colonies, his gross returns would be doubled, and the increased profitableness of the occupation would soon induce others, having the necessary aptitude to learn, to do likewise. The commercial beekeepers of southern Ontario are continually increasing the num-

ber of their colonies, keeping them in out-apiaries with the help of an automobile.

A thing that causes much work in the apiary in Canada, especially outside of southern Ontario and the St. Lawrence Valley, is swarming, to control which in our northern latitude requires the strongest measures. In many parts of northern Ontario and northern Quebec, a long continued honey flow, which makes beekeeping very profitable in favourable years, calls for measures for the prevention of swarming that will have a long lasting effect.

The principal experiments now being carried on at the Central Experimental Farm are therefore in the reduction of labour in the apiary and especially in methods of effectively controlling swarming that require only the easiest and least number of manipulations, and eliminate the necessity of watching for swarms. Progress has been made. For those places where swarming begins about a month before the commencement of the principal honey flow, a system of raising and wintering two queens in a hive, which not only prevents early swarming but produces two strong colonies in time for the honey flow has been devised and tried.

For the control of swarming during the main honey flow, the most satisfactory method seems to be requeening with a young queen, pre-

ENTOMOLOGICAL BRANCH

THE USE OF THE AEROPLANE IN ENTOMOLOGICAL WORK

BY DR. C. GORDON HEWITT, DOMINION ENTOMOLOGIST

THE great development of the aeroplane and its manifold uses during the war have led to much discussion concerning the ways in which it may be used for peaceful purposes. The transportation of passengers, mail and freight are obvious uses; in Quebec experiments are being made with a view to testing the value of aeroplanes (hydroplanes) in forest protection work, and undoubtedly they will be

Mr. Eric Hearle, who holds a studentship of the Advisory Council on Scientific and Industrial Research, and is investigating the mosquito problem in the Lower Fraser Valley of British Columbia under the direction of the Dominion Entomologist, recently made this discovery and by using an aeroplane from Chilliwack, B.C., he was enabled to make a very comprehensive survey of the complicated water system of the Fraser



PHOTOGRAPH TAKEN FROM AEROPLANE OF FRASER RIVER NEAR CHILLIWACK, B.C.
SHOWING ISLANDS CONTAINING ALDER SWAMPS WHICH CONSTITUTE IMPORTANT
MOSQUITO BREEDING PLACES.

used in the future for surveying purposes.

We have discovered a use for the aeroplane in entomological work, namely, to assist in carrying out surveys of mosquito breeding areas. In undertaking such surveys one is often confronted with the difficulty of mapping out the swampy areas and other breeding places quickly with any degree of accuracy. By means of an aeroplane photographic surveys can readily be made and the results plotted out on paper. Such a method of surveying would save a large amount of time involved in travelling around such areas for the purpose of delimiting breeding grounds, particularly in level country.

River and the adjacent bodies of permanent and temporary water in that district. His flight convinced him of the value of the aeroplane for survey work of this nature.

In forest insect work also, if the utility of the aeroplane or hydroplane for forest protection work is demonstrated, it will be possible to use such a machine for making surveys of timber that is being killed or has already been destroyed by forest insects, for upon such surveys successful control work depends. At the present time the making of these surveys is a difficult and often very arduous and lengthy task and the character of our forests must necessarily make them incomplete.

**THE EXPORTATION OF NATIVE GROWN NURSERY STOCK
TO THE UNITED STATES UNDER UNITED STATES QUAR-
ANTINE No. 37.**

CONSIDERABLE apprehension has been felt by many Canadian nurserymen and florists on account of Quarantine No. 37 of the Federal Horticultural Board, United States Department of Agriculture, which went into effect on June 1, 1919. According to the regulations issued under this quarantine, Canadian nurserymen and florists were prohibited from exporting to the United States practically all kinds of nursery stock with the exception of certain bulbs, seeds, stocks, cuttings, scions, and buds of fruits and certain rose stocks for propagation. No exception was made, however, for ornamental trees and shrubs grown in Canada. An amendment to these regulations was passed last March which permitted the importation into the United States "in limited quantities" of nursery stock and other plants and seeds "for the purpose of keeping the country supplied with new varieties and necessary propagating stock." As the amendment definitely stated that stock other than that listed as being permissible to import, could only be shipped into the United States in limited quantities and as this quarantine would undoubtedly prove to be a hardship on our nurserymen and florists, the Department of Agriculture made representations to the United States Department of Agriculture with a view to securing an amendment to the quarantine that would permit the entry of native-grown Canadian nursery stock into the United States.

We are pleased to say that our recommendations have been accepted in the friendly and co-operative spirit that was anticipated and as a result the following Amendment No. 3 to Quarantine 37 was passed on August 16.

"Regulation 15. Permits for the Importation of Otherwise Prohibited Stock from Foreign

Countries Contiguous to the United States.

"When it is deemed by the Secretary of Agriculture that the importation from countries contiguous to the United States of any class or classes of nursery stock and other plants and seeds the entry of which is not otherwise provided for by these regulations will not be attended by serious risk to the agriculture, horticulture, or floriculture of the United States, permits may be issued, on application, authorizing the entry of such nursery stock and other plants and seeds under safeguards as may be prescribed in the permits; Provided, that importations under this regulation shall be limited to specific classes of nursery stock and other plants and seeds which can be considered as peculiar to such contiguous countries, and not mere reproductions of imported stock from foreign countries, and which are not available in sufficient numbers in the United States; Provided further, that this shall not apply to nursery stock and other plants and seeds governed by special quarantines and other restrictive orders than Quarantine 37, now in force, nor to such as may hereafter be made the subject of special quarantines; Provided further, that in addition to the certificate required by Regulation 7, the invoice covering nursery stock and other plants and seeds offered for entry under this regulation must be accompanied by a certificate of a duly authorized official of the country of origin, stating that the nursery stock and other plants and seeds proposed to be exported to the United States have been produced in the country from which they are proposed to be exported."

Under this provision it will be possible for western nurserymen and

florists, for example, to export to the United States northern-grown caraganas and other hardy trees that are in demand in the north-western states of the Union, and the

reciprocal trade in nursery stock between Canada and the United States will not be unnecessarily interfered with.

APPOINTMENTS IN THE ENTOMOLOGICAL BRANCH

MR. W. DOWNES, Temporary Assistant at the Dominion Entomological Laboratory, Victoria, B.C., has been appointed a Junior Entomologist and will assist Mr. R. C. Treherne, Entomologist

in charge for British Columbia, in the investigations on small fruit insects that are being conducted on Vancouver Island and the Lower Fraser Valley.

MR. M. B. DUNN, Temporary Assistant at the Dominion Entomological Laboratory at Fredericton, N.B., has been appointed an Entomological Assistant in the Division of Forest Insects of

the Entomological Branch, Ottawa, and under the direction of Dr. J. M. Swaine, he has been assigned to sample plot investigations in the forests of Quebec and Ontario.

MR. LEONARD S. McLAINE, M.Sc., has been transferred from the Dominion Entomological Laboratory, Fredericton, N.B., to Ottawa, and appointed Chief of the Division of Plant Inspection and Executive Assistant to the Dominion Entomologist. As Chief of the Division of Plant Inspection, Mr. McLaine will have

immediate charge of the work of inspection and fumigating imported nursery stock, and of the field work against the Brown-tail Moth in Eastern Canada, and such other duties as the enforcement of the insects and pests regulations under the *Destructive Insect and Pest Act* may involve.

FRUIT BRANCH

CAUSES OF FAILURE IN CO-OPERATION

BY C. W. BAXTER, FRUIT COMMISSIONER

WE read and hear a great deal about the successes of co-operative organizations, and of the advantages to be gained from co-operation, but very little do we hear of the causes or instances of failure.

So far as co-operative methods and principles apply to the marketing of fruit, the major causes of failure are, first, lack of a keen realization by the members of the need of organization; second, disloyalty to the association; and third, the absence

of salesmanship ability in the management.

A few years ago, in one of our neighbouring states to the south, a Bureau was established in the Department of Agriculture, to assist in the formation of fruit growers' co-operative societies. The executive head of the Bureau was fully seized with the importance of the duties assigned to him, and worked hard for one year, during which he succeeded in organizing a large number of associations. Subsequently he

appeared before a large convention and confessed that he was the "dead head of a dead Bureau." He pointed out that while it was a comparatively simple matter to organize associations, he had been unable to compel the members to co-operate. He clearly demonstrated that the movement had been unsuccessful either because the members of the newly formed societies had previously been receiving satisfactory returns, or because for other reasons they did not fully realize the need for the adoption of co-operative methods.

There are on record statistics which show that many industries, which had been almost complete failures where individual efforts have been followed, have been re-established by co-operation and by the stick-to-itiveness of their members and to-day are in a most flourishing condition. In many of these instances the members have been impelled by the feeling that it was a life or death struggle for their industry. So long as there is a lack of appreciation of the need for co-operative operations, there is not likely to be any great measure of success, if any.

The loyalty of members towards their association is a most important factor. Cases are not infrequent where organizations have failed because of the disloyalty of one member. This has been demonstrated very recently in one of the western states. The members of a co-operative organization had obtained accurate estimates of the crop in which they were specializing; they agreed as to what would be a fair market value; they agreed to sell their total production at a specific price. One of the members was induced by outside interests to sell for a lower price, apart from

his fellow members. The result was unprofitable returns for their product, the disruption of marketing conditions and the disorganization of the co-operative body.

Production and marketing are two distinct phases of the fruit industry. One may be most proficient in the production of fruit but still lack in salesmanship ability. The very fact that a grower has been most successful in growing fruit is frequently the reason why he is not proficient in marketing. The demand upon his time will not permit him keeping in very close touch with varying market conditions and he is placed at a disadvantage when marketing his product. Neither production nor marketing can be learned out of books nor in a brief period of practical experience. To be successful in marketing requires an experience of several years and too frequently the sales manager of a co-operative association is selected from among its members. A high standard of quality may be maintained, but the disposal of the crop at unsatisfactory prices has often caused the abandonment of co-operative methods.

Salesmen who have proven most efficient cannot be obtained for small salaries and unless the tonnage handled by an association is sufficient to meet this expense, it is impossible to secure an efficient officer. It might at first glance appear to be hopeless for individual organizations to successfully market their fruit. This, however, is not always the case as many small associations have been most successful. But the best results may be obtained by the formation of a central selling organization, through which sufficient tonnage can be marketed to warrant the payment of a salary large enough to secure an efficient salesman and manager.

LIVE STOCK BRANCH

WHAT IS CANADA GOING TO DO ABOUT IT?

BY H. S. ARKELL, M.A., B.S.A., LIVE STOCK COMMISSIONER

A BIG, profitable live stock, meat and produce trade is open to Canada overseas. What is Canada going to do about it? No one doubts that the success of the Canadian live stock industry is and will be dependent upon the extent and variety of our export trade. We cannot eat all we produce. Further, we cannot afford to. If we would purchase abroad, we must sell abroad and our credit balance with foreign countries is already heavily overdrawn. To redress this balance, we must rapidly extend the output and export of the products of our land. Theoretically we agree to the truth of this statement. Practically we decide to pass on to the other fellow the duty that it implies. In fairness to the Canadian farmer, it must be admitted that the responsibility for shifting this obligation lies less with him than with the great masses of people who are content to crowd our cities and towns, creating thus a problem for society which it is taxing human ingenuity to solve. If Canada needs one thing more than another, she needs labour upon the land,—honest, dependable labour to swell our farm production to a volume that will ensure a steady and permanent exportable surplus of the supplies that Europe wants. This way lies success.

The London agents of our Canadian packers reviewed in disappointment the orders for Canadian goods—bacon, eggs, etc., for which they could obtain but a tenth of the product they required. The unwarrantably high price of hogs in Canada during the past months is but a reflection of the reputation of Canadian bacon as compared with American and demonstrates the effort of our packers to maintain their connection with old established clients

in the face of short supplies. Since Denmark within a year will again be a factor in the bacon market, our only security for the future is full production and such a substantial export supply as must command recognition by its volume and quality. Short hog production is unquestionably the most dangerous policy Canada can adopt. This is true of eggs as well as of bacon.

Respecting cattle, herein lies a problem that will prove a worthy test of Canada's nerve, ingenuity, and determination. The difficulties are great but they are not insurmountable. In the Argentine and Australia are more and better cattle than in Canada and these countries are proving much cheaper sources of supply. The Argentine has landed live cattle in Italy and is proposing to do likewise for Germany via Antwerp. The United States is trading with France and is busy in Holland, endeavouring to secure passage to Germany via Rotterdam. We have secured this concession for Canada on account of the health of Canadian cattle and it now remains to see what advantage we can take of it. Two Canadian firms only, one Western and one Eastern, have as yet dared to face the risks of live cattle export and they deserve all the success and profit which they are likely to obtain from it. I am firmly of the opinion that this live cattle trade must become a necessary part of our cattle policy. So far as Europe is concerned, we are only at the beginning of this business, even if in the end it prove not to be permanent. Germany, France, and Belgium are now in the market for fat cattle and the landed price is from £65 to £75 per head. Further, next spring there will be large demand for feeding and breeding cattle, the latter chiefly of the Holstein and

Shorthorn sorts. I recommend the organization of companies of producers to join with commission men in the development of this business. The present avenues of distribution must be widened; otherwise other countries will secure the business to Canada's disadvantage.

Linked with the live cattle trade is the establishment of a chilled beef business. Canada cannot compete with the Argentine and Australia in frozen meat. Owing, however, to shorter haul, we have an advantage in the export of chilled beef. It is suggested that the difference in price in favour of the latter article will be from 1d. to 2d. per lb. Our packers are thoroughly investigating this trade and preparing themselves for it, when the proper moment arrives. The production of a sufficient quantity of high class meat will alone make this trade possible. The cattle business of Canada can be made a great success if we set ourselves wisely and determinedly to the task. Otherwise, it will prove a dismal failure. In this business, however, more than in any other, we must widen the channels of distribution and therein the producers themselves should have an important part to play.

As regards dairy products, butter is everywhere at a premium and Canadian cheese holds a similar reputation to Canadian bacon. The shortage of milk and dairy products in Great Britain is unprecedented. The same is true of Europe. Partly this is due to the scarcity and high price of concentrated feed. It is a condition that is so general as not quickly to be remedied. This condition, in fact, is regarded with the gravest concern by those who have in hand the difficult task of agricultural reconstruction. It is retarding also the increase of swine production and the restoration of the normal requirements of fat. The consensus of opinion is that the future of the export trade in dairy products is assured.

With regard to horses, a Scotch firm, the agents of a big transport company whose manager I met in London, has recently taken a consignment of heavy Canadian draft horses to Great Britain. Motor transport is apparently unable to displace good heavy drafters, either for city or farm use, and for choice animals, London is paying from £175 to £250 per head. An aggressive Canadian firm, prepared to deal straight-forwardly with British purchasers and to carefully hand-pick every animal sent forward, should make a little money out of this business. Good horses are in demand even for farm use. New York has already offered horses on the London market.

A similar scarcity exists on the continent. Belgium is in need of large numbers of moderate priced horses for use by the repatriated peasants and France is in the market for heavy horses of the Percheron type for city and country use. Good horses of this sort are worth 6,000 francs each and are hard to get. French buyers have recently been on this side to secure a number for use in the vineyards in the south of France, but were obliged to defer buying meanwhile, owing to the present low exchange value of the French franc. Notwithstanding this fact, the market exists and business will eventually be done. As regards the Mediterranean countries, no trade offers at present although the Canadian case has been fully presented to Italy, Serbia, Roumania, Greece, and Poland. Greece, it may be noted, is now making inquiry regarding light horses and dairy cattle. The sale of Canadian ponies for fresh horse meat has been investigated but appears not to be practicable owing to the present cost of transportation. The meat may eventually go forward after being boned and frozen or salted and packed in barrels.

It is recognized that transportation for live animals now constitutes a problem. The general feeling is, however, that space will shortly

offer more freely and at easier prices. Further, just so soon as the abundant supplies of beef from the Argentine and Australia begin to come forward regularly and in volume, the advantage of the live cattle trade to Canada will at once become apparent. European countries are eating frozen meat but they are all, even Germany, prepared to pay a premium for fresh killed beef. The people are tired of the poor quality stuff that they have been obliged to eat during

the war and there is still enough money amongst them to pay for the better article. If Canada can take full advantage of this demand while our packers are adjusting their business to the development of the trade in chilled beef, it may help to tide us over a very difficult period. In conclusion therefore, I desire to emphasize the importance of an extension of this business and of the number of those engaging in it.

SPECIAL PRIZES FOR FINISHED LIVE STOCK

BY W. R. REEK, B.S.A. ASSISTANT LIVE STOCK COMMISSIONER

THERE are too many partially finished animals being marketed at the present time and it appears that it would be in the best interest of the farmers if they would give more consideration to quality and finish before placing their animals on the market. In order to bring this fact to their attention the Live Stock Branch has conceived the idea of offering special prizes which would place emphasis on quality and finish in market classes only. In many cases a month's extra feeding, which would probably entail the

purchase of some concentrates, would be sufficient to give the quality and finish which our experience on the markets has conclusively shown us to be very essential if we are going to prepare a large percentage of our meat products for the British market. The plan adopted is to provide funds sufficient to meet the prizes offered in certain classes at the fat stock shows held throughout Canada during the winter.

The classification proposed is shown in the following schedule:—

MARITIME PROVINCES SHOW AT AMHERST, N.S.

CLASS 1

For finished steers—any breed or grade

Sec. 1. 1,200 lbs and over.....	\$15-12-10-8-5
" 2. 1,000-1,200 lbs.	\$15-12-10-8-5
" 3. Under 1,000 lbs.	12-10-8-5

CLASS 2

For groups finished steers—any breed or grade

Sec. 1. Best three owned by one exhibitor.....	\$40-35-30-25-20-15
" 2. Best five owned by one exhibitor.....	\$75-65-55-40-25-20

(Animals shown in Section 1 cannot compete in Section 2)

SHEEP.

Finished sheep—any breed or grade

Sec. 1. Best group five yearling wethers or ewes... ..	\$ 12-10-8-6-5-4
" 2. Best group five lambs wethers or ewes.....	\$ 12-10-8-6-5-4
" 3. Best group ten shearling wethers or ewes.....	\$30-25-20-15-10-8-6-5
" 4. Best group ten lambs ewes or wethers....	\$30-25-20-15-10-8-6-5

Dressed carcasses

Sec. 5. Best group three yearling carcasses.....	\$12-10-8-6-5-4
" 6. Best group three lamb carcasses.....	\$12-10-8-6-5-4

SWINE

Finished bacon hogs—any breed or grade

- Sec. 1. Best group three.....\$20-15-12-10-8-6
 " 2. Best group five.....\$20-15-12-10-8-6

Dressed carcasses

- Sec. 1. Best group three.....\$20-15-12-10-8-6
 " 2. Best group five.....\$20-15-12-10-8-6

DRESSED POULTRY

- Sec. 1. Best six chickens all one breed. \$8-7-6-5-4-3-2
 " 2. Best twelve cockerels packed in a suitable box for export.
 " 2. American Breeds.....\$10-8-6-5-4-3
 " 3. Asiatic Breeds.....\$10-8-6-5-4-3
 " 4. English Breeds.....\$10-8-6-5-4-3
 " 5. Best three dressed geese 1919.....\$ 5-4-3-2
 " 6. Best three turkeys 1919.....\$ 5-4-3-2
 " 7. Best three dressed ducks 1919.....\$ 5-4-3-2

(Birds shown in regular classes not eligible. Entries free for Producers only)

EASTERN ONTARIO WINTER FAIR AT OTTAWA

CLASS 1

For finished steers—any breed or grade

- Sec. 1. 1,200 lbs. and over.....\$ 35-30-25-20-15-10
 2. 1,000-1,200 lbs.....\$ 30-25-20-15-10-5
 3. Under 1,000 lbs.....25-20-15-12-10-5-3

CLASS 2

For finished steers—any breed or grade

1. Best three owned by one exhibitor. \$75-65-55-40-25-20
 2. Best five owned by one exhibitor.....100-80-70-60-50-40

(Animals shown in Section 1 cannot compete in Section 2)

SHEEP

Finished sheep—Any breed or grade.

1. Best group three yearling wethers.....\$ 12-10-8-6-5-4
 2. Best group three lambs.....\$ 12-10-8-6-5-4
 3. Best group ten shearling wethers.....\$30-25-20-15-10-8-6
 4. Best group ten lambs.....\$30-25-20-15-10-8-6

Dressed carcasses

5. Best group three yearling carcasses.....\$ 12-10-8-6-5-4
 6. Best group three lamb carcasses.....\$ 12-10-8-6-5-4

SWINE

Finished bacon hogs—any breed or grade, 160-220 lbs.

1. Best group five.....\$35-30-25-20-15-12

Dressed carcasses

2. Best group five.....\$35-30-25-20-15-12

DRESSED POULTRY

1. Best six chickens all one breed. \$8-7-6-5-4-3-2
 2. Best twelve cockerels packed in a suitable box for export.
 2. American Breeds.....\$ 10-8-6-5-4-3
 3. Asiatic Breeds.....\$ 10-8-6-5-4-3
 4. English Breeds.....\$ 10-8-6-5-4-3
 5. Best three dressed geese 1919.....\$ 5-4-3-2
 6. Best three turkeys 1919.....\$ 5-4-3-2
 7. Best three dressed ducks 1919.....\$ 5-4-3-2

(Birds shown in regular classes not eligible. Entries free for producers only).

ONTARIO WINTER FAIR AT GUELPH

FINISHED CATTLE

1,350 lbs. or over.....	\$25-22-20-18-15-12-10-8
1,200 lbs.-1,350 lbs.....	\$25-22-20-18-15-12-10-8
1,000 lbs.-1,200 lbs.....	\$25-22-20-18-15-12-10-8
Under 1,000 lbs.....	\$25-22-20-18-15-12-10-8

SHEEP

Class 1. Wether lamb under one year old, pure bred, grade or cross bred, short wool.	\$15-13-12-10-9-8-7-6-5-4
Class 2. Wether lamb under one year, pure bred, grade or cross, bred long wool.	\$15-13-12-10-9-8-7-6-5-4

Carcass class

Class 3. Wether lamb under one year, pure bred grade or cross bred, short wool.	\$15-13-12-10-9-8-7-6-5-4
Class 4. Wether lamb under one year, pure bred grade or cross bred, long wool.	\$15-13-12-10-9-8-7-6-5-4

SUGGESTED REGULATIONS FOR SHEEP

1. No exhibitor allowed to enter more than one entry.
2. All animals entered in the live class must be killed and shown in the carcass class, the carcasses to be disposed of at public auction.
3. No animal exhibited in these classes shall be allowed to be exhibited in any other class.
4. All animals must be docked.

1. Best group of four—Export bacon hogs weight 160-230 lbs.
2. Dressed carcasses.

Best group of five —Export bacon hogs.
\$40-35-30-25-20-18-15-12-9-6-5-5

WESTERN WINTER FAIRS

CATTLE CLASS 1

Best 15 fat steers owned by one exhibitor 1,000 lbs. or over . \$350-250-200-150-100-50

CLASS 2

Best 5 steers over 1,100 lbs., owned by one exhibitor \$100-80-70-60-50-40-30

CLASS 3

Best 5 steers under 1,100 lbs., owned by one exhibitor \$100-80-70-60-50-40-30
Animals competing in Class 1 not eligible for Class 2 and 3.

SHEEP

Finished sheep any—breed or grade

1. Best group five yearling wethers \$20-18-15-12-10-8-6
2. Best group five lambs..... \$20-18-15-12-10-8-6
3. Best group ten shearing weathers. \$30-25-20-15-10-8-6
4. Best group ten lambs..... \$30-25-20-15-10-8-6

Dressed carcasses

5. Best group five yearling carcasses..... \$20-18-15-12-10-8-6
6. Best group five lamb carcasses. \$20-18-15-12-10-8-6

SWINE

Finished bacon hogs—any breed or grade

1. Best group five \$20-18-15-12-10-8-6

Dressed carcasses

2. Best group five \$20-18-15-12-10-8-6

POULTRY (Dressed)

Best twenty-four fat chickens.. \$25-20-15-12-10-8-6-5

POULTRY DIVISION

RECOGNITION OF CANADIAN EGG STANDARDS

MR. W. A. BROWN, Chief of the Poultry Division of the Live Stock Branch, departed for England on September 18th to attend a meeting of the International Committee on Standardization of Eggs. This committee constitutes a section of the International Association of Poultry Instructors and Investigators. A report of the meeting of this association which Mr. Brown attended on March 14th, was published in THE AGRICULTURAL GAZETTE for June on page 584. The meeting will be held in London on September 24th, 25th and 26th. It will be attended by delegates from Denmark, Holland, France, the United States and Canada in addition to those representing Great Britain and Ireland. The purpose of the meeting is to secure recognition of egg standards that have been adopted by exporting countries with a view to securing confidence in standardized eggs throughout the world and therefore an increased consumption of

eggs. Mr. Brown took with him an exhibit of eggs graded according to the Canadian standards as well as the equipment used in the Canadian grading service. Other countries will provide for the meeting corresponding exhibits. Mr. Brown will endeavour to secure the widest possible recognition of the Canadian egg standards. These standards have already been well received by the British trade as indicated by the following communication from one of the leading egg importing firms in Great Britain:

"First, we would like to say that the Canadian eggs packed in boxes bearing the Government stamp give confidence to the buyers on this side, and without doubt the supervision which your Branch exercises in this trade will do good. English importers are attaching a good deal of importance to this official stamp, and in the near future it will be a means of giving confidence between the buyer here, and the shippers in Canada.

The reputation of Canadian eggs is decidedly improved, and we look with confidence to much increased business as soon as times are more normal, and exports allowed freely as in pre-war times."

The cow is a most wonderful laboratory. She takes the grasses of the pasture, and the roughage of the field and converts them into the most perfect food for man. In that food there is a mysterious something which scientists have found essential to the highest health of the human race, and which can be found nowhere else. Men have sought for centuries the fabled Fountain of Youth. The nearest approach to that fountain which has yet been discovered is the udder of the cow. Without her milk, children languish, the vigour of the adult declines, and the vitality of the human race runs low. Millions of these gentle, unobtrusive "foster mothers" of man have become the victims of this war. The world faces a shortage of dairy products. Let us of Illinois help meet this shortage in every way we can.

Frank O. Lowden, Governor of Illinois.

PART II

Provincial Departments of Agriculture

CAUSES OF FAILURE IN CO-OPERATION

Co-operation in the agricultural industry has made rapid strides in Canada during the past few years. This movement has received the attention of The Agricultural Gazette since its inception more than five years ago. Comparatively little, however, has been written regarding the failures in co-operation which from time to time occur. With a view to bringing out the causes of this there have been brought together the views based upon the experiences and observations of officials in several of the provinces of Canada. Occasional failure in co-operation is not confined to Canada. In a publication issued by the extension service of the Massachusetts Agricultural College, Dr. Alexander E. Cance, Professor of Agricultural Economics, brings forward some of the reasons of failure in New England, as well as the more prominent essentials to success. A summary of Dr. Cance's statement is published as the concluding article in this series.

NOVA SCOTIA

BY M. CUMMING, D.A.SC. SECRETARY FOR AGRICULTURE

WHILE co-operation has made substantial progress among the farmers of Nova Scotia, yet it is still in its infancy and the movement has unfortunately credited to it a number of instances of failure. Thinking over these failures, the writer is impressed with the fact that the first and all important cause of failure has been the management. We think of instances in which farmers' companies have been fortunate in securing good management at a low cost, but on the other hand, we recollect a number of instances where an inferior manager was employed in preference to a tried manager because the former offered to work for a lower salary. There is no virtue in the high salary *per se*, but there is everything in the good man whose services should be secured whether they cost little or much. Unfortunately for co-operation a first-class business man, under the prevailing system of doing business, can generally earn a much larger salary in private business than in a cooperative business. Co-operators must recognize this and must be prepared to pay a good man sufficient salary to hold his services.

The writer remembers some ten years ago going to St. Catharines, Ont., to inquire into a co-operative business which was being conducted there. Practically every farmer whom we interrogated said that co-operation was Robert Thompson, who was then the manager of the St. Catharines Cold Storage Company. To the theorist, this might seem a strange answer, for one of the essentials of co-operation is that every member is, in a certain measure, manager of the business. However, in practice, the average farmer is so busy with production that he cannot pay much attention to the details of buying and selling, and hence it comes about that these most important details have to be attended to either by the active management of the co-operative body or by some private individual and, therefore, as far as buying and selling are concerned, which are after all the practical ends of co-operation, the active management itself counts for everything.

A second frequent cause of failure is that the organization has been formed before its members were sufficiently educated to its value. The majority of the most successful co-

operative organizations of which the writer has read, or heard, or observed have been those that were born because of the great obstacles with which the members were confronted. These very obstacles or hardships formed the avenue for the education of the co-operative members. In our own province several co-operative associations have been formed and have failed because the members had not been educated in the hard school of experience as to the value and necessity of co-operative organization and it seems difficult to educate them satisfactorily after the organization has been effected. Fortunately the successful operation of co-operative organization in some localities is proving a means of educating the residents of other localities and it seems likely that this avenue of education will prove the means of a much larger growth of co-operation. Personally we believe it is a great mistake to try to drive co-operative organization. The movement to be successful must in the main come from the members themselves but they may seek information and direction from the various sources open to them.

A third cause of failure in Nova Scotia has been the attempting to operate with too few members and consequently the conducting of too small a volume of business to make it possible to buy or sell to advantage. Nonetheless, co-operative movements often start in a small way and it has frequently happened that successful organization has grown out of an original attempt on the part of a few farmers to buy, say, a carload of feed or fertilizer or similar commodities, the success of which has paved the way for a substantial increment of membership and increase of business. There are cases, however, where it would have been better business for a small group of farmers in one locality to join with a co-operative

organization already formed and take advantage of their better buying facilities than to try to conduct business in a small way.

A fourth and very frequent cause of failure has been the insidious opposition from without. Even under the best of management mistakes are bound to be made at times. The opponents of co-operation seize on these mistakes and make use of them as a means of arousing discontent and lack of faith among the membership. Such occurrences must to some extent be used as a means of education and conferences must be held which will give the membership a big outlook and they must be advised that there are bound to be some failures which must be judged in the light of the general business of the company and not by themselves. We can think of several instances where properly balanced judgment along these lines would have held co-operative organizations together, which have otherwise broken up.

In discussing this last cause of failure, we must not be understood as advising all members to allow the management to do anything they please. The members must take an interest in the business but in judging the methods adopted by the management they should not take isolated instances of failure but consider the whole volume of business done by the management.

Finally, there are local reasons why co-operation has sometimes failed. There are localities where the people are naturally more suspicious of each other than in other localities and various other individualities in special localities which are accountable for the failure in co-operation.

Nonetheless, co-operation is making substantial progress. It is yet in its infancy but the movement has in it the possibility of solving many of the most serious obstacles with which the farmers, as a class, are confronted.

NEW BRUNSWICK

BY E. P. BRADT, B.S.A., SECRETARY FOR AGRICULTURE

MANY reasons might be given why co-operative associations have failed in the past. It is only fair to say that reasons for failure are becoming better understood and guarded against by those responsible for carrying on the business of these associations. Experience is always the best teacher. As a co-operative association grows, it gains in experience. Right here might be mentioned the first reason for associations failing or at least partially failing. An attempt is often made to start in on too large a scale, before the necessary experience has been gained, and often before sufficient capital is provided to carry on the more extensive operations that are undertaken. This is usually disastrous. The manager is not only handicapped by lack of knowledge and experience but also by lack of capital, with the result that some unexpected thing happens, the association is unable to weather the adverse conditions and goes under. This can be avoided by starting in a smaller way, growing up with the business and always keeping well within the capital or credit of the association, particularly at the beginning of its existence.

Still another cause for failure is often due to the practice of so called economy in the employment of a manager. His services are often very inadequately rewarded and, in many cases, sufficient money will not be paid to secure the services of a competent man. The amount of money that can be paid will depend on the volume of business, but it is safe to assume that associations will only get what they pay for. In these days of keen competition it requires a keen, energetic man, possessing good business ability, to successfully manage a co-operative association of any size.

A third reason which might be given is that an association is usually anxious to make a good showing at

the beginning and often operates on too small a margin. In selling supplies to the members they attempt to cut prices considerably below the regular trade prices. In selling products for the members an effort is made to return to the member at once a price well above the current market price. This usually brings keener opposition from old established business and frequently has a harmful reaction in that rivalry is started and an attempt usually made to break up the organization. By running on too close a margin there is nothing provided in the way of a fund to take care of emergencies that often occur in any business and an otherwise strong-going association may fail when these difficulties are encountered. The co-operative dividend returned to the member according to the amount of business he has transacted after setting something aside as a sinking fund overcomes this difficulty. Current prices can be given at time of sale or purchase and any balance divided among members according to the above plan. This does not interfere with regular established business in any way and is a much safer plan to follow.

Cases of lack of loyalty to the association on the part of members are still encountered but these are becoming much less frequent. The disloyal member has always been and always will be a weak link in any association. Many associations are eliminating him through stringent regulations and seeing to it that these regulations are enforced.

The co-operative movement is undoubtedly gaining strength from year to year in Canada. The gain in strength by individual associations is usually in direct proportion to the safeguards adopted against some of the causes of failure enumerated above. A few unfortunate business reverses to an association not properly organized and with no provision made for such reverses will often impair the growth

of such an association for some time, even if they do not cause it to actually fail. The co-operative principle is sound; all it needs is to be backed

up by sound business practices to carry an organization through to success.

ONTARIO

BY GEO. B. HOOD, Editor O. A. C. Review.

TECHNICALLY Speaking co-operation does not fail. The co-operative principle has been proved sound and practical; but its inherent qualities unfortunately make of its application a complex problem. It is because the organizers of many co-operative movements in the past have disregarded one or more of the natural fundamentals that their attempts have not met with success.

Just as all progress is the sequence of the dissatisfaction with old processes, so co-operation is a result of the discontent over the business methods of private enterprises. A community must be ripe for co-operation before any such movement is organized, otherwise failure is certain. Co-operation must be "born of necessity." The farmers of a section must have sufficient grievance against "the middlemen" of their district to give them a just cause for action. A contented populace presents to the demagogue an unfruitful soil in which to sow the seeds of revolution; a neighbourhood of farmers who are satisfied with their treatment by the men from whom they buy and sell are likewise not prepared to listen to the over-enthusiastic leader who possesses more insight than they. Without doubt this has been one of the most common reasons for failure in the past, and, although there probably existed a genuine excuse for breaking away from the old ways, a sufficient number of the farmers did not realize the fact.

Inseparably connected with the necessity that must exist is the unfaltering support that a member must be prepared to give his co-operative association. In every case

the man who does not "stick" is one who has not realized the need that his association was filling. Another factor closely related is the opposition offered by those whose interests are affected by co-operation. This opposition bears fruit because there are always a certain percentage of men who would sell their birth-right for a mess of pottage. When a buyer pays them a little more than their association can obtain for them, they forget that it was their association that achieved the increased prices in the first place. If a merchant sells them some goods cheaper than they can obtain them from their association, they disregard the fact that the same merchant did not cut his price until the independent competition of the co-operative association forced him to. Nor do they realize that these acts kill the goose that lays the golden eggs.

Many co-operative associations have failed through incompetent management. Such an organization is much more difficult to manage than a private corporation. In an ordinary joint-stock company the shareholders seldom take an active interest in its management, but invest expert officials with the task. However, in the case of the co-operative organization, the farmer-member assumes the responsibility of an expert, being free to give advice as he sees fit. Unless a judicious manager is at the helm, such inexperienced counsel may have disastrous effects, although again, it may be used constructively, if carefully sifted out.

Through the desire for economy, lack of business ability or good judgment on the part of the members, incompetent managers are often

secured. Frequently they are local men who have unsuccessfully tried to manage a business of their own or who have, because of certain qualities, other than business, been local leaders. In any event, the management is frequently turned over to men possessing ability according to the low salary offered. It is but natural that, under such guidance, an association should quickly capsize.

Moreover, a co-operative association offers an entirely different proposition to a manager than does a private business, and a man who may successfully manage a private company will fall down when placed over a co-operative organization. Unless a manager realizes this fact and studies out the various new problems that a co-operative association presents he will fail.

To succeed a co-operative organization must pay dividends the first year. In this respect it also differs from the private company. In the latter a far-seeing manager may build for several years, knowing that at the end of that time the profits will justify his action. But in a co-operative company the members are farmers who are only interested in it for what it will gain for them in the immediate future. They are not concerned about the profits five

years hence as they may not be there to enjoy them. Moreover the number of men who have sufficient faith in the co-operative idea to wait long for an association to become a paying concern is, as we know, limited. It is here that the question of speculation enters, speculation has caused the downfall of a number of co-operative associations. Such an organization should never indulge in speculation. No manager or board of directors should hold a product in storage or buy up goods on a "hunch." It is more likely to prove wrong than right and if wrong will put a young organization out of business.

Co-operation has owed a great deal of its failure in the past to a lack of education. It was an entirely new idea to the farmers of this country and they were unacquainted with its benefits and fundamentals. It is interesting to note that one of our pioneers of co-operation in Ontario has said that, whenever he went into a district where there were several men who had been trained at the agricultural college, the task of organizing a successful co-operative association was much less difficult. This goes to prove that once farmers understand the nature and the results of co-operation we will no longer need to inquire into the causes for the failure of co-operation.

SASKATCHEWAN

BY W. W. THOMSON, DIRECTOR, CO-OPERATIVE ORGANIZATION

FAILURES in co-operative enterprises may be divided into two classes—1st, those in which associations become insolvent and have to be wound up to meet the claims of creditors and 2nd, failures which are simply the termination of the business due to loss of interest by the shareholders but where no insolvency results.

In Saskatchewan, thanks due to the provisions of the Agricultural Co-operative Associations' Act, which requires that all co-operative asso-

ciations shall conduct a strictly cash business, failures of the kind first mentioned are practically unknown. In the five and a half years which have elapsed since the Agricultural Co-operative Associations' Act came into operation, 456 co-operative associations have been registered and 43 of these have gone out of operation. One association, through misfortune rather than by mismanagement became insolvent and was wound up to satisfy the claims of its creditors. Five were dissolved owing to the fact

that the shareholders had decided to amalgamate with other associations in their districts and the remaining 37 were dissolved owing to lack of interest among the shareholders resulting in the associations ceasing to be active business organizations. The quest for the causes of failure in this province might therefore be narrowed down to the query "Why do shareholders lose interest?"

There are three primary causes for the loss of interest; many shareholders appear to look upon their association merely as another source from which supplies can be obtained and fail to realize that its success depends upon their support. This condition usually exists in associations having shares of a small par value or in other words where shareholders have but a small investment. It is usually found that a man's interest in any concern is about proportionate to his investment and that associations which require that shareholders invest \$50 or more, secure better support and retain the interest of shareholders better than organizations where the investment is smaller.

A second cause of the loss of interest is to be found in the fact that many associations carry on their business

spasmodically; carloads of goods are brought in from time to time but no regular stock is maintained. Organizations which maintain permanent stocks either in warehouse or in retail stores, secure better support. The increased convenience more than offsets the added cost of distribution and the warehouse or store serves as a permanent centre from which the activities of the association radiate and thereby gives stability to its work.

The third reason for loss of interest lies in the tendency evident in some associations to leave the business management in the hands of a small group of the shareholders who eventually develop into a kind of governing clique. It is necessary that there should be some leading spirits in every association but there can be no justification for leaving the management to a few no matter how enthusiastic or capable they may be. The associations are primarily democratic institutions and if they are to succeed every shareholder must feel that it is his duty to be fully conversant with all the details in connection with the business and must take part in determining its policies and directing its actions.

ALBERTA

BY JAMES MCCAIG, CHIEF PUBLICITY COMMISSIONER

WE have no records or knowledge of the failure of co-operative associations or enterprises in the province of Alberta, although it is possible that there may be cases of this kind. The people of this province seem to be peculiarly susceptible to co-operative action and they have made a success of it in both buying and selling and are doing much important business through their commission men at

central markets in such places as Calgary and Edmonton.

We have no special co-operative official in the province. Our co-operative associations are of local origin. The government, however, gave important aid to the co-operative work in the loans that were made for co-operative elevators some years ago. This had an important influence in wheat marketing and in making further co-operative enterprises possible.

REASONS FOR FAILURE IN CO-OPERATION

BY ALEXANDER E. CANCE, PH.D.

CO-OPERATION among farmers in New England has never been very enthusiastically received although it must be said that several very successful farmers' co-operative societies, both for purchase and for sale of products, have been formed in our eastern states. Some of the alleged reasons for the lack of enthusiasm on the part of our New England farmers are first, the individualism of the farmer, his desire to do his own marketing and to make his own bargains, and perhaps his dislike of interfering in his neighbour's business or to permit his neighbour to interfere in what he considers private matters.

So far as individualism is concerned, there is proper individualism and an individualism which is exceedingly disadvantageous to the man who has a product to put upon the market or to men who are buying quantities of agricultural requirements. A man may foster his individualism at the expense of his financial common sense. As a matter of fact, the old independent farmer about whom so much has been said has practically gone out of existence. The farmer of to-day depends upon his market quite as much as the grocer does. His products are frequently prepared for market, shipped to market, handled by marketmen in precisely the same way as are the products of the manufacturer. Consequently the farmer is interested in the amount his neighbour sells and in the quantity the consumer in his marketing town purchases. He is interested in railroads, transportation, banking, and all means of exchange, and the markets of the world measurably affect him.

In the second place, it is said that the farmer has not sufficient business ability to conduct a co-operative organization. While this is true in a number of instances, it should not be true of the farmers of New England who are said to be as shrewd bargainers as any farmers in the world. The farmers of New England are intel-

ligent and should be as enterprising and as capable of handling the co-operative associations as the farmers of Ireland, the farmers of Denmark, or the farmers of Texas.

Another legitimate reason for the failure of co-operative organizations among farmers has been the fact that most organizations of farmers have had so many purposes that the real object of the association has become obscured. This has been one difficulty in the formation of business co-operative associations by the Grange. Again, too, a good many of these co-operative societies have failed because the members of them have had no common interest; a co-operative organization is a very simple thing but each should be composed of men who are bound together by some common interest. A large number of purposes or objects is likely to defeat the whole end and aim of a business enterprise.

A great many co-operative societies have failed because of lack of good management or because they were not founded on business principles. On the whole, a careful study of the situation leads students of the subject to believe that the New England farmer is quite as capable of organizing along co-operative lines as any farmer in the world, provided he lay down and follow a few simple principles that make for safety and permanency of organization.

ESSENTIALS FOR SUCCESS

There are several essentials to successful co-operation. The first of these is sufficient material, in a given community, with which to do a co-operative business. It is useless to co-operate in milk selling or in the formation of a creamery association if there are not sufficient cows or sufficient milk to make an organization worth while.

A second essential is that the co-operating area be rather small. It is much easier for a number of far-

mers in a small community to organize for purposes of purchase or sale than it is to have the farmers scattered over a county or two. Consequently intending co-operators might well consider the advisability of growing one or two special crops, by all the members of the association. This is called by economists, geographic specialization.

Loyalty is a third essential to organization. There is no use considering a co-operative society unless the members are loyal to the association even to the point of suffering some loss for the sake of keeping the association alive and prosperous. This loyalty is one of the most noticeable features of successful co-operative societies in the United States and other countries. The members uphold their societies against all charges, furnish the required raw material even when the co-operative society pays them less than they could receive outside and sometimes even when co-operative selling is not always as successful as individual selling. This same loyalty is demanded in other business corporations and is necessary in any form of voluntary co-operation. Members must believe in their society, must believe in co-operation and must believe in each other. Without abiding faith and loyalty on the part of the members it is useless to endeavour to form a permanent farmers' business association.

A fourth essential is singleness of purpose. Most successful societies are organized either for buying or selling only. A co-operative society should be organized to sell apples or to buy feeds or other agricultural requirements, or to store produce. If these same farmers desire to co-operate with others for some other purpose they should form a second association. The reason lying at the base of this is simply that if the farmers have a single aim it is much more easy for them to do business. They can forward that aim in a simple and straightforward way. One of the

safest pieces of advice that can be given to intending organizers of co-operative exchanges is that they keep the aim of the society single and simple and take into the organization only such men as are interested in the purposes of the organization.

A fifth essential is incorporation. Nearly every successful co-operative society is incorporated under provincial or state laws. This provides for a definite board of directors; a definite time during which the society shall do business and a definite policy regarding the debts of the society. It makes the society subject to the laws of the country and causes its business to be conducted on approved business lines.

Another essential is paid, efficient management. A great many of our co-operative societies have gone to the wall because the management was inferior or because the management was in too many hands. In order to handle the business that is scattered as widely as the business of a farmer's co-operative society it is necessary to have one man who will hold the reins in his own hands. This man is the manager who should be hired by, and be under the control of, the board of directors, and together with the board of directors he should lay down his plan of operation and his system of business. This having been done the manager should have a free hand to carry out his plans in the matter of seeking a market, of buying and selling, and he should not be interfered with.

Absolute publicity regarding the affairs of the society is necessary. This includes a full and complete oversight of the books, papers, and policies of exchange by its members, and in addition a careful supervision of the accounts, at stated intervals. The books should be audited at least once a year by a committee who do not belong to the board of directors or management, and a report in writing made to the members at the general meeting of shareholders. This helps to allay suspicion and keeps

the society from slackness and carelessness. There should be no secrecy in a co-operative organization.

Another essential to successful co-operation is that the business be done as far as possible on a cash basis. Extension of credit has been a rock on which a good many otherwise successful organizations have been wrecked beyond repair. Temptation to extend credit to members or to outside interests is very great but in general it is decidedly safer to make all business the cash business. Adequate capital is necessary to finance a co-operative society and a good rule to follow in planning the amount is this--ascertain as accurately as possible every expense that the exchange

is likely to incur for a year in advance, making full and complete allowance for outside figures; having found this, multiply the amount by two.

Finally every co-operative association should be organized on strictly co-operative principles. A number of co-operative societies, both in this country and abroad, are merely joint stock companies some of which are operating more or less successfully. Nevertheless there are some principles which are essential to the true spirit of co-operative endeavour and which in the long run give better financial and social results than others.

SUMMER SCHOOL REPORTS

NOVA SCOTIA

BY L. A. DEWOLFE, DIRECTOR

ALTHOUGH the attendance at our 1919 summer school session was somewhat smaller than usual we accomplished more than at any previous session. The enrolment was 106 and the usual classes were conducted but we branched out in new directions that proved helpful. In addition to the fourteen subjects on our programme one or two extras were offered. Every student was given a slight introduction to the art of canning.

Our school garden and greenhouse were better than ever and each student had an active part in the care of these departments of our work. Our school garden is really the public garden of Truro now. It has been visited by scores of townspeople daily.

During the session we enjoyed a number of musical evenings and evening lectures which proved helpful and popular. On Peace Day our students prepared a decorative rural science float which was much admired in the street parade and which "tied" for first prize. Taking part in the

parade was in itself an education to many of our rural students.

Our greatest departure from the ordinary timetable, however, was the programme of sports in connection with our annual Model Exhibition. Throughout the province school sports are neglected. Many teachers, however, have learned what can be done in this line.

In order to imitate rural conditions as far as possible, the summer school was divided into six groups--each group representing a rural school. Thus six schools were brought together at one central exhibition. Each group chose a name for its school, arranged its programme, made its banners and costumes for the general school parade, chose its exhibition booth in the science building, arranged its exhibits, and chose its representatives for the various sports. All entered heartily into the activities and really felt they were school children again. Competition was keen. The judges' decisions were awaited as eagerly as in any real school children's exhibition. Preparation for

and carrying out the programme constituted the hardest week's work ever performed at a Truro summer school.

The indoor exhibit was the prettiest and the most educative of any ever

held at the summer school. We are glad of the progress made from year to year. It will surely help modernize school methods throughout the province.



RURAL SCIENCE SCHOOL GARDEN. NORMAL COLLEGE, TRURO, N.S., 1919.

NEW BRUNSWICK

A. C. GORHAM. B.S.A., M.Sc. DIRECTOR, AGRICULTURAL INSTRUCTION.

THE Rural Science School for teachers was held at Sussex, July 8 to August 4 with an enrolment of thirty-seven. This number is not large, but taking all things into consideration it is very encouraging. The number of teachers who had taken up other lines of work during the war have not yet returned to the teaching profession. It must be expected that readjustment will be comparatively slow. However, if the number was small it was compensated for by the greatest interest and enthusiasm. Every member of the school was a keen student and the way they applied themselves indicated the class of teachers attending the school.

The great importance of the work seemed to be uppermost in their minds and a determination to carry it to a successful issue was characteristic of all. With such enthusiasm and a realization of the responsibilities of the profession we look forward with very sanguine hopes for the great success which nature study and agricultural education deserves.

The object of the course is greater efficiency on the part of the teachers that they, through these more or less practical subjects, may be better able to train their pupils and inculcate higher ideals of citizenship.

It was very gratifying indeed this year to receive so many visits and

such a large number of requests from school trustees for teachers qualified to teach nature study and agriculture. We regret that the number of available teachers with the agricultural certificate is not sufficient to meet the demand.

Besides the purely class-room duties and practical work in the garden, literary and social activities played no small part in making for a well balanced course.

The school opened with a social evening at which a large number of prominent citizens were present. Several of those most interested in the work addressed the students and spoke very encouraging words. The acting mayor, Mr. J. C. Mills, welcomed the students to Sussex and wished them success in all their work.

Each week the students held some social function. Good programmes were arranged. These and the picnic added not a little to the enjoyment of the course.

Two illustrated lectures were given by Mr. Wm. McIntosh, Instructor in Nature Study. His very popular talk on a "Canoe Trip through New Brunswick" was thought by many to be surpassed by his interesting and vivid description of New Brunswick Indians and their customs in pre-historic times.

Many special lectures were given by members of the different divisions of the Department of Agriculture. In this way the most up-to-date information was given in the principal agricultural subjects.

From the very beginning of the Rural Science School it has been the purpose of those in charge to make the course as practical as possible. Much of the instructors' time is taken up with direction of experiments and demonstrations and giving lessons which may be taught in rural schools. The cultivation, arrangement, and planting of crops in garden are all done by the students, thus putting into practice our motto, "learn to do by doing." In this way

we seek to create a healthy desire for the work, to give opportunity for the realization of greater responsibility on the part of the pupil, to give him the power of applying his education for the betterment of his country, for his own happiness and those around him.

The closing exercises were held on the evening of August 1 giving the students an opportunity to return to their homes on Saturday instead of remaining over the week end to hold the closing on Monday as was at first intended. The papers read by the students on this occasion were of a very high character and were favourably commented upon. Dr. Melvin, Chief Medical Officer for the province gave a very interesting and instructive talk. The health of a community and how many diseases might be controlled and epidemics prevented if some instruction could be given teachers so that they might be able to recognize symptoms of certain diseases and practise some control measures in their schools.

Division standing is as follows:—
From 80 to 100, First; from 70 to 80, Second; from 60 to 70, Third. An average of 60 is required to secure a pass, with no average in any one subject below 50.

The number passed in each division;
Division I, 6; Division II, 3;
Second year work—Division I, 10;
Division II, 13; Division III, 5—
First year work.

INSTRUCTORS

Mr. Wm. McIntosh, Prov. Entomologist—Nature Study, Plants, and Animals.

Dr. F. E. Wheelock, Acadia University—Physical Nature and Environment.

Prof. H. S. Hammond, Macdonald Agricultural College, St. Anne de Bellevue—Chemistry of Soils, Plants, and Animals.

A. C. Gorham, Director—Plant Life and School Gardening.

SASKATCHEWAN

A. M. MCDERMOTT, B.S.A., DIRECTOR OF SCHOOL AGRICULTURE

THE Attendance at the Summer School for Teachers was this year the largest on record. As in previous years courses were given at the University of Saskatchewan, Saskatoon.

In many districts summer vacations are of three weeks duration or less, and for the accomodation of many of these teachers the various courses were this year divided into quarters, the first and third running concurrently July 2 to 19; the second and fourth running concurrently, July 21 to Aug. 9. This feature proved valuable as evidenced by those taking advantage. One or two quarters of any course may be taken each summer and four or two years respectively required to complete the course.

Courses were offered in Agriculture and Science, Art, Manual Training, Household Science, Health Education, Music. Of those, the largest registrations occurred in Art, Agriculture, and Household Science respectively.

Covering the same time classes or half classes in Arts and Science were offered by the University. The total registration was approximately 150 with 77 of these in teachers' courses.

As arranged, students registered in any other course had the opportunity

of qualifying in music, also. The Health Education, comparatively a new feature, was a strong department of the work for all classes and is likely to become quite popular in the future. Included in it were physical training, athletics, indoor and outdoor, and classes in swimming and folk dancing twice each week.

Several excursions were made to the Forestry Station, local industrial plants, through special departments at the University, etc.

Addresses by strong speakers serving to broaden the view of the teachers in attendance were those given by Norman M. Ross, Chief of Tree Planting Division, Forestry Station, Indian Head; Dr. Ferguson, Superintendent Sanitarium Qu'Appelle; Dr. J. T. M. Anderson, Director of Education among New Canadians, Regina; J. E. McLarty, lately of Rural Science Department, Prince of Wales College, Charlottetown, P.E.I.; F. Bradshaw, Chief Game Guardian, Department of Agriculture, Regina, also Dean Rutherford, Dean Ling, Dr. Thompson, and Dr. Manning of the University.

It is felt that the co-operative efforts of the University and the Department of Education will be repaid by an increasingly large attendance in future.

BRITISH COLUMBIA

BY J. W. GIBSON, M.A., DIRECTOR OF ELEMENTARY AGRICULTURAL EDUCATION.

ALTHOUGH somewhat smaller in point of numbers, the Summer School at Victoria, July 7th to Aug. 8th, 1919, was one of the best ever held in B.C. Many teachers, at the close of the spring term, were feeling rather fatigued after a year of hard work and of unusual nervous strain owing to so many interruptions and so much loss of time due largely to the epidemic of influenza. The majority of teachers who attended did so at a sacrifice.

They were all genuinely in earnest and did exceptionally good work during the course. At the conclusion of the course the opinion was general that the work should not only be continued but extended so as to take in a wider range of subjects.

In addition to the regular courses a number of primary grade teachers gave a couple of weeks to special methods in the teaching of primary reading, stories and dramatization. It is quite probable that a more

complete course of this character will be given in future. A series of lectures on rural educational problems, by Professor Julius B. Arp of Minnesota, were greatly appreciated.

The closing exercises took the form of a banquet which was attended by the Honourable, the Minister of Education, the Superintendent, and other invited guests. During the evening the high school was open to the public, a large number of people taking advantage of the opportunity to see something of the work of the summer school students in their various lines of work.

Following is a statement of attendance by classes:

I. <i>Rural Science:</i>	Men	Women
(a) Preliminary Course . . .	2	16
(b) Advanced Course. . .	5	3
II. <i>Art:</i>		

(a) Preliminary Course.	5	25
(b) Advanced Course.	1	12
III. <i>Manual Training:</i>		
(a) Manual Arts Course.	0	22
(b) Rural M. T. Course.	9	0
(c) Preparatory Course for Manual Instructors.	12	0
(d) Supplementary Course for Manual Instructors	9	0
IV. <i>Household Science:</i>		
(a) Preliminary Course.	0	6
(b) Advanced Preparatory Course.	0	20
(c) Supplementary Course for Household Science teachers	0	5
V. <i>Vocal Music and Elocution:</i>	1	15
VI. <i>General Science and Art:</i> (Physics, Chemistry, Botany & Zoology for High School Teachers).	7	8

Number of men students . . .	51
Number of women students . . .	132
Total number of students. . .	183

RURAL MINISTERS' COURSE AT MACDONALD COLLEGE

IT is generally recognized that the most effective agents in moulding the thought and action of the community are the rural pastor, the rural teacher, and the county agricultural demonstrator. Their contact with the people, as we know, is very close and vital, and their influence as leaders, when properly directed, is of far-reaching importance in the development of the highest community ideals and living.

But proper direction of the forces of a community requires special training. The pastor as well as the teacher and agricultural demonstrator should know his special problems and what has been done in other districts towards the solution of the problems.

With this idea of making the rural pastor a more useful leader a Short Course for Clergymen for the study of country life was given at Macdonald College from August 5 to 14. Special attention was given to the problems of organization of the rural community, to the factors in operation, and to the best means of bringing about an improvement.

The speakers were Professor Phelan of the Massachusetts Agricultural College; Mr. Lindeman of the Chicago Y.M.C.A., and Canon Tucker of London, Ont., with the assistance of members of the staff of Macdonald College.

The attendance totalled eighty-three individuals, mostly ministers from rural districts. The programme included lectures on all manner of rural problems dealing with the home, the school, the church, and the whole community in general. Sir Horace Plunkett's motto "Better Farming, Better Business, Better Living," summarizes the three groups of problems of the country. Each one in itself a complex group requiring skill to solve. All were broadly dealt with and discussed by the students at the course.

This is the first time that plays, games, and singing have been included in the programme. The demonstrations, practices, and lectures, directed by Mr. E. C. Lindeman, were appreciated by the large class of clergymen who entered into the spirit of the work wholeheartedly.

They played all kinds of games—games for the home, the school, and countryside—they practised songs, serious and comical, but all suitable for gatherings of young people. This class of rural pastors returned to

their homes, not only feeling many years younger than when they came to Macdonald, but also filled with the desire to introduce some of the things they learned into the life of their home communities.

NOVA SCOTIA

EGG LAYING CONTEST

BY J. P. LANDRY, MANAGER POULTRY DEPARTMENT NOVA SCOTIA AGRICULTURAL COLLEGE

THE Egg Laying Contest announced in the September Gazette is creating an unusual amount of interest amongst the poultrymen of Nova Scotia. By

the 12th of September thirty-four entries had been received. This exceeded our expectations as we had provided accommodation for only thirty entries.

NEW BRUNSWICK

POLICIES ADOPTED FOR THE ENCOURAGEMENT OF SHEEP RAISING

BY E. P. BRADT, B.S.A., SECRETARY FOR AGRICULTURE

THE province of New Brunswick is especially adapted for sheep raising and the Department of Agriculture is putting forth every effort to encourage the extension of this industry. While it is highly desirable to have many more sheep in the province, it is also of importance to work towards improving the quality of the breeding stock so that a superior class of sheep will be raised.

Plans of a very practical nature have been decided upon to encourage both pure-bred breeders and breeders of grade stock within the province. In order to encourage the man who has never before used a pure-bred ram to purchase one this fall, the department is supplementing the ten dollar premium offered by the Dominion Live Stock Branch to the extent of five dollars, this amount payable as soon as the ram is purchased and evidence submitted that a pure-bred ram has been purchased. Through this co-operation with the Dominion Live Stock Branch, it is expected that many farmers will be

induced to purchase a pure-bred ram for the first time. The fifteen dollars received as a premium will bring the price down more nearly to the level of that of a grade. Under these circumstances, there will be every inducement for a man to purchase a pure-bred.

Another policy decided upon, embodying a plan which has never been attempted by any province in Canada is the grading of all the pure-bred rams offered for sale in the province. The services of an outside man will be secured. This person will be a qualified sheep judge who will visit each pure-bred breeder in the province and classify the rams for sale into three grades, superior, average and common. These rams will be marked according to their grade. A farmer can write to a breeder for any grade that he desires and be sure of getting a ram up to the standard of that particular grade. The number for sale in the different grades together with the price that the breeder is asking for each will

be listed with the department at Fredericton. Information can thus be furnished to any one wishing to make a purchase where he can secure a ram of the breed and grade required. This purchase can be made by mail practically as satisfactorily as by a personal visit.

The pure-bred breeder will get a cash premium of three dollars for each three star ram and two dollars for each two star ram produced. No premium will be given for the one star or common ram. This cash premium is expected to encourage better breeding methods on the part of pure-bred men and will be an incentive for them to pay a higher price and secure a better ram to head their flocks, in order that they may get as many of their rams in the higher grades as possible.

Boys' and girls' sheep clubs are also being organized. Arrangements have been made through the Bankers' Association so that any bank in the province will provide credit to *bona fide* members of the provincial clubs. Two grade shearling ewes will be the number allotted to each member. They can get twelve months' credit at six per cent interest at the banks. The department will supply a pure-bred ram to any club with ten or more members. The ewes will be bred before being distributed. Special club fairs will be held at which prizes will be given on lambs and sheep. It is expected that returns in wool and lambs will enable the boys and girls to meet their note when it falls due.

QUEBEC

QUEBEC AGRICULTURAL REPRESENTATIVES VISIT THE ORMSTOWN FAIR

THE Quebec Agricultural representatives were authorized by the Honourable the Minister of Agriculture to attend the live stock exhibition held at Ormstown in June, in order to improve their knowledge in live stock matters.

This fair is considered to be one of the most important of the kind in the province of Quebec, as well for the quality as for the number of animals exhibited. It is the meeting place of the best breeders of the province, who bring their best animals. They were enabled, through the courtesy of the directors, to follow the judging of all the classes and study the good and weak points of the animals presented. Despite a terrific heat, the representatives followed closely the work of the judges and got a very good idea of the qualities that should be present in an animal for its class and breed.

The representatives took advantage of the opportunity to visit the district and some of the leading farmers. A stop was made at Messrs. Prud'homme of Ste. Philomene, and Younie, of Ste. Martine, two of the best beekeepers of the province. They received a hearty welcome at Mr. Robert Ness', Howick, whose farm was visited. At the Heart's Delight farm, two splendid types of Percheron and Belgian horses were seen. The manager of the farm, Mr. Hamilton, showed the large fields under cultivation, and the up-to-date buildings of the farm, and gave detailed information.

The information gathered during the trip will be very useful to the representatives. While visiting one of the finest agricultural districts of our province, they were able to pick up valuable knowledge which will be used by them in giving advice to the farmers of their districts.

ONTARIO

THE SCRUB BULL CAMPAIGN

FURTHER steps have been taken to develop the Scrub Bull Campaign which was described by Mr. C. F. Bailey, Agricultural Commissioner, in the *July Gazette*, on page 659. Six counties will be selected for special attention. These meetings will be held in all parts of the counties, sufficiently close together to enable all farmers to attend. The meetings will be addressed by live stock men with a view to impressing upon the farmers the advantages of using pure bred sires. The motion picture will be used as an ocular demonstration of the superiority of well bred stock. At these meetings, spring bull sale associations will be formed with a view to working up a successful bull sale for each county. Each association will have a committee of three to pass upon the bulls offered for sale. The Ontario Cattle Breeders' Association is taking an active interest in this campaign. A representative of the Association will attend each sale for the purpose

of inspecting the animals sold. If they meet the approval of these representatives the Ontario Department of Agriculture will contribute a grant to the sale association for the purpose of assisting in defraying the expenses of the sale. The remaining counties of the province will be dealt with in a different manner.

The breeders of pure bred cattle will be invited to list with the Department of Agriculture the bulls they have for sale. These will be inspected by representatives of the Ontario Cattle Breeders' Association. If the quality is found satisfactory and the price at which the animals are offered meets with the approval of the association, the Department of Agriculture will publish a list of the animals and endeavour to secure purchasers. By this means it is hoped that the scrub bulls in many of the counties will be readily replaced by pure bred animals and a material improvement effected in the cattle raised in the province.

POULTRY EXTENSION WORK IN ONTARIO

BY F. N. MARCELLUS, B.S.A. LECTURER IN POULTRY, O.A.C., GUELPH

DURING the period of the war serious curtailment of poultry extension activities in the province of Ontario was necessitated by lack of efficient help. With the close of the war and the return of many qualified men from overseas the provincial Department of Agriculture has instituted a progressive move by the organization of an Extension Branch of the Poultry Department of the Ontario Agricultural College, Guelph. The writer, who for the past seven years has been connected with the Poultry Department as lecturer and extension specialist, has been appointed chief of the new branch with headquarters at the Poultry Department, O.A.C., Guelph.

Two men, Mr. E. S. Snyder and Mr. P. D. Vahey have been appointed temporarily to assist with the extension work.

One of the important lines of work being carried on by the Extension Branch at present is the supervision of the breeding flocks at the hundred and twenty-five poultry breeding stations operated in the various counties of the province by the agricultural representatives. These are farmers' flocks of pure-bred birds, mostly Barred Rocks, utilized to secure eggs for hatching for the Rural School Fall Fair movement. These flocks are inspected twice each year, summer and winter. At the time of the summer inspection the flocks are

culled, the inspector marking all birds considered suitable to be carried over the following year, and discarding the poor and unprofitable birds. The inspection of the flock in the winter is mainly for the purpose of removing such birds as are considered unsatisfactory for breeding purposes.

During the present summer the Extension staff are conducting a number of public poultry culling demonstrations at which the salient points indicating high egg production are pointed out. These demonstrations are being conducted mostly at the poultry breeding stations and at the same time the breeding station flock is culled, so that those who attend have the opportunity of examining not one bird, but several. The demonstrations are in all cases well advertised. A large poster is used and this is followed by fifty to one hundred circular letters sent out by the agricultural representatives to the people in the immediate vicinity of the demonstration centre.

At the time the culling work is done a report is made out in duplicate on a report form covering specific points and having a space for details. Under "details" is given such information as the number of medium and high producing hens in the flock, interest in the work, number, size and general conditions of houses, pens,

etc. It is hoped that from these reports some definite information will be secured as to the actual conditions to be found on the average farm keeping pure-bred hens and the quality of the stock kept. In order to make these records as complete as possible record work is being started with the flocks at the various breeding stations. Monthly record cards are supplied by the Extension Branch upon which to report the various facts as they occur each day, such as egg production, kinds and amounts of feed, etc. A sheet of instruction for the keeping of the records is also supplied so that the reports will be as uniform as possible.

Feeling the need for better killed poultry for the markets throughout the country the branch is also putting on a killing and plucking demonstration at the same time that the culling demonstration is given. The interest in this part of the work has been as great in many cases as the culling work.

Apart from the above work the staff of the branch will be engaged in lecture and demonstration work throughout the province, aiming always to give out as much information as possible by demonstration and visitation, working in co-operation with the agricultural representatives, local poultry associations, and similar organizations.

MANITOBA

PEDIGREED ALFALFA SEED

FROM the product of a single plant of pedigreed hybrid alfalfa raised in 1916, there has been threshed this year forty pounds of seed, which it is estimated should give fully thirty pounds of clean marketable seed. The Field

Husbandry Department of the College intends to multiply this improved strain of alfalfa with a view to producing sufficient stock to make it available to the farmers of the province.

SASKATCHEWAN

CAMPAIGN AGAINST SOW THISTLE

THE Weeds and Seed Branch of the Saskatchewan Department of Agriculture has secured the co-operation of the different railway companies in the province in the important work of exterminating the perennial sow thistle, Saskatchewan's worst weed. The Department's field representatives are taken over the entire railway system in motor cars while on their work of locating and measuring patches of grain. Careful records of every patch are kept in the Weeds and Seed Branch and field representatives will notify the local weed inspector who, in turn, will see that the proper measures for eradication are taken. The work is now proceeding with regularity and dispatch.

This weed is practically confined to the railway yards where, either

in cleaning out stock cars or unpacking goods, the seeds of this dangerous weed were scattered. It is noticed that along the Canadian Pacific Railway almost all patches of the weed are on the northern side of the track. This is explained by the supposition that the contractors engaged on the second or double track must have fed feed infested with sow thistle, whereas the contractors of the early days had clean feed.

The boys and girls of the province are asked by the Department of Agriculture to help the work of the weed inspectors by reporting patches of sow thistle. A special drive is being undertaken this year and the rural teachers are able to give the pupils full particulars regarding the contest.

STAFF CHANGES IN THE SASKATCHEWAN UNIVERSITY

The following appointments, which affect the agricultural faculty in the Saskatchewan University, have recently been made,—

Assistant Professor of Dairying, A. E. Potts, M.Sc., (Edin., Ames).

Professor of English, W. D. Thomas, B.A., (Wales, Oxford).

Professor of Bacteriology and Pathology, W. S. Lindsay, M.D., (Edin.).

Instructor in French, G. Gallon, M.A., (Chic.)

Professor of Biology, A. E. Cameron, B.Sc., (Aber.).

BRITISH COLUMBIA

PROGRESS AT COLLEGE OF AGRICULTURE

BY F. M. CLEMENT, DEAN OF COLLEGE OF AGRICULTURE

CONTINUAL associations with the university day after day is apt to lead one to believe that progress at this college is slow, but a careful survey of the development during the past five years shows a marked advance to our objective. Five years ago the university site was almost all bush but to-day more than 100 acres are in field crops. The experimental work

of the department of agronomy has been increased to occupy 15 acres. The horticultural area has not been extended but naturally the trees are larger and the growth stronger. The permanent wing of the dairy barn, now housing about forty head of stock stands out very prominently against the woods to the south and a new stock barn built under the Soldiers' Civil Re-establishment, is

ready to accommodate twenty head more of cattle and horses. This is the soldiers' practice barn. Numerous poultry houses, colony and laying houses accommodate about 2,000 birds and practice houses for students have sprung into existence in a little more than one year. A class room, comfortably accommodating sixty or more students, is now in use and a dairy with working accommodation and apparatus for ten students at a time was completed on September 1st. The dormitories for the men under the Soldiers' Civil Re-establishment are now in use also and will accommodate about seventy-five students.

In the department of animal husbandry Mr. H. M. King, formerly of the Ontario Agricultural College, has been made assistant professor. Mr. J. Dudley French of the Manitoba Agricultural College, and Mr. H. R. Hare, who was Agricultural Representative in Halton County, Ontario, have been made instructors to returned men. In the department of agronomy Mr. G. G. Moe, late of the Dominion Experimental Farm, Ottawa, is now assistant professor, and Mr. George Boving of Macdonald College, Quebec, has been appointed instructor to returned men. In the department of horticulture Mr. A. F. Barss of Oregon Agricultural College has been appointed associate professor, and Mr. W. A. Middleton of Macdonald College, Quebec and Mr. L. R. Jones, Vine-land Station, Ontario, are instructors to returned men. In the department of dairying, in addition to Mr. Wilfrid Sadler of Macdonald College, Quebec, the recently appointed head of the department, Mr. N. S. Golding, formerly of Ontario Agri-

cultural College, has been made instructor to returned men. In the department of poultry the head of the department, Professor A. G. Lunn, formerly of Massachusetts Agricultural College, is assisted by Mr. E. A. Lloyd, late of the Grain Grower's Guide Winnipeg, who is instructor to returned men.



F. M. CLEMENT, B.S.A., DEAN OF THE COLLEGE
OF AGRICULTURE, UNIVERSITY OF BRITISH
COLUMBIA

The College of agriculture cannot yet lay claim to large class rooms and laboratories but a very excellent beginning has been made and every credit is due to the former dean, President Klinck, for the manner in which he slowly but surely laid the foundation and gathered together the material of construction.

CO-OPERATION OF FRUIT GROWERS

CO-OPERATION among the fruit growers of British Columbia began, as is usual, with the dissatisfaction of the treatment received at the hands of proprietary fruit traders. In 1912 the proprietor of a considerable orchard property undertook the organization of the growers of the Okanagan Valley on co-operative lines. The Okanagan Valley is by far the most important fruit growing area in British Columbia. The assistance and sympathy of the provincial Government was given to the movement, which was strongly supported by many of the leading fruit growers. That year eight local associations were formed in the following districts: Vernon, Kelowna, Penticton, Peachland, Summerland, Enderby, Armstrong, and another since defunct.

The work of these associations was to assemble, grade, and pack according to standard rules all fruit and vegetables grown by the respective shareholders, and to otherwise prepare the same for market. The government advanced eighty per cent of the capital required to build and equip the necessary central packing sheds to enable this to be done. At the same time a united selling organization was set up called the Okan-

agan United Growers. This company was formed of the growers who constituted the several local associations but was registered as an independent concern with a share capital of \$10,000, and a paid-up capital of \$28 only. No further calls have since been made. The functions of this organization were to find a market for all the fruit and vegetables packed by the different local associations. This it did and has continued to do very satisfactorily, so much so that it is now fully recognized to be the controlling selling organization of British Columbia. The local associations have been equally successful in handling their end of the business.

The joint organizations go to show what can be done by co-operation when intelligently conducted along economic lines, even in the face of serious difficulties. The difficulties in this case lay in the fact that only fifty per cent or less of the growers supported the movement, and that progress had to be made against the very firmly established footing of some half-dozen proprietary firms. The Okanagan United Growers was further handicapped by the loss of a lawsuit during the second year of its existence, involving the payment of \$30,000.

"Cultivators of the earth are the most valuable citizens. They are the most vigorous, the most independent, the most virtuous, and they are tied to their country and wedded to its liberty and interests by the most lasting bonds." Thomas Jefferson.

PART III

Junior Agriculture

DEMONSTRATIONS, COMPETITIONS, AND CLASS-ROOM STUDIES IN RURAL LIFE FOR BOYS AND GIRLS

NOVA SCOTIA

THE SOUTH BERWICK COMMUNITY CLUB

BY IRMA H. CAMPBELL, RURAL SCIENCE TEACHER, BEAR RIVER, N.S.

THE organization of this Club arose from a direct need of the community for something which would bring the people together for recreation and social intercourse, and link the home with the school, the latter being an object which is constantly kept in mind by those actively engaged in the work of the Club. The idea of a Community Club was freely discussed among the residents of the section for some weeks before any attempt at the actual forming of a Club was made. This served to awaken interest in both old and young, and when a meeting was held, the people came with a clear idea of what was under consideration. At our first meeting we had over thirty people, of ages varying from fifteen to sixty-five. Everyone was ready with suggestions and criticisms, and before the meeting closed we had an organization of twenty-five members. This number has now increased to forty.

The organization in itself is very simple. It is known as the South Berwick Community Club, and meetings are held weekly on the school premises. Besides the usual officers, and executive committee, there are sports, social, and educational committees, the chairman of each of these being also a member of

the executive. The parent-teachers committee is apart from the others, being changed every month. The work of this committee is to visit the school, keep in touch with school activities, and promote a spirit of co-operation between teachers and parents.

The aims of the Club, as set forth in the constitution, are as follows:—

- (1) To improve opportunities for community social life.
- (2) To arouse pride in ownership and improvement of civic buildings and institutions.
- (3) To beautify the homes of the members, and the community in general.
- (4) To afford opportunities for the members to develop ability in organization and in conducting public meetings in proper order.
- (5) To foster the spirit of co-operation instead of individualism.
- (6) To substitute the constructive idea for the destructive.
- (7) To constitute a force for the protection of all property, whether public or private, from acts of vandalism.
- (8) To instruct the young people of the community in good deportment in public meetings and on the street.
- (9) To promote good citizenship by intelligent discussion of live political questions, aside from party issues.
- (10) To train the younger members of the community in those things which are necessary for good local citizenship.

That these aims are being slowly realized can be readily seen from the

work accomplished. Some years ago a lady resident obtained permission from the trustees to start a garden on the school grounds, and as a result of her efforts there was at one time a beautiful garden, sixty-five feet square, containing many rare and beautiful shrubs and perennials. Through neglect and acts of destruction the garden lost much of its beauty, but the club hired a man for heavy work, while the children, supervised by the lady who first planned the garden, transplanted and weeded until it is again a thing of beauty. Thus are the children being taught pride in their surroundings and love of beauty.

The club has also placed a handsome 50 ft. flag-pole on the school grounds, and purchased a sixteen foot flag. A formal flag raising was held on June 3rd, when addresses were given by local clergymen, and the school children presented a beautiful pageant of the Allied Nations.

Tennis and croquet have been provided for the younger set, all on the school grounds, which are ample, and there is plenty of room for baseball and various sports. The Sports Committee endeavors to keep "something doing all the time" on club nights.

Money has been raised by membership fees, and by suppers, fes-

tivals, etc., which serve two purposes, inasmuch as they furnish a good time and bring in the money. No private subscriptions have been asked for or received. The Social Committee have charge of all affairs for the raising of money, and thanks to their efforts, the club has thus far been self-supporting.

During the winter months the Educational Committee will plan for lectures, lantern shows, debates, musical evenings, etc. There is a fine hall over the schoolhouse, equipped with stage, dressing rooms, etc., making it possible to present plays by local talent. This hall is used for club meetings as well as for Sunday school and occasional church services. Thus the school is actually the community centre.

Undoubtedly the club is proving a success. The people are working together in harmony for a common purpose, namely, the civic and social improvement of the community. The children work and play with their elders, and learn the value of co-operation. They are recognized as young citizens, and are being trained in the elements of good citizenship. No miracles have been wrought, but good results are slowly but surely making themselves apparent.

ONTARIO

RESULTS FROM A CALF CLUB

UNDER the supervision of the agricultural representatives a number of live stock clubs have been formed in various counties in Ontario. The aim of these clubs is to encourage boys and girls to take greater interest in live stock and to enable the boys and girls to put into practice the best methods of feeding and caring for animals. The first of these clubs to hold its sale of stock is one of those in Halton county where, at Oakville fair grounds on August 20, twenty-seven heifers were sold.

The animals were divided into three classes according to the price paid for them. They were judged by Professor Geo. E. Day of the Dominion Shorthorn Breeders' Association, who placed the animals, and in a short speech to the boys emphasized the need in Canada of stock of a higher class. He congratulated the boys on the splendid appearance of their animals.

Some of the individuals sold for prices very much above the average while most were auctioned off at about the average price. Most of

the animals were bought back by the boys who had fed them. The receipts for the sale of the twenty-seven heifers totalled \$7,760, or an average of \$287. The first nine which were purchased last spring at from \$215 to \$225 sold for an average of \$350. The second lot which cost \$180 to \$200 brought an average of \$296, and the third class bought at from \$160 to \$175 averaged \$215. Every one was well satisfied with the results of the sale and it is expected that another club will be formed in the near future.

This club was organized in December, 1918, under the supervision of W. F. Strong, Agricultural Representative, assisted by an advisory committee of four Shorthorn men. The calves were drawn by lot and distributed to the boys and girls in February. The value of the animals ranged from \$150 to \$225, depending on their age, condition, and pedigree. This value was ascertained by comparison of the calves and their pedigrees after they were assembled at

the distributing point, they were not valued according to the cost prices. The Halton County Shorthorn Calf Club Association took the boys' and girls' notes, without the endorsement of parent or guardian, for the cost price of the calf. After these notes were taken to the bank a note covering the total amount was signed by several of the prominent men of the district.

As may be seen in the foregoing statement the sale and show was a splendid success. The prices realized were good and the object in forming this calf club, which was to try and induce both children and parents to take an interest in pure bred stock, was attained. The interest of adults and young people is shown by the fact that the majority of calves were bought back by their owners. Sixteen were re-purchased by the boys and girls, five were bought by men in the county and the remaining six were sold out of the county.

BOYS AND GIRLS' LIVE STOCK WORK 1919

BY R. S. DUNCAN, B. S. A., SUPERVISOR, AGRICULTURAL REPRESENTATIVES

DURING the past two years twenty-two live stock clubs have been organized among the boys and girls of Ontario. The members of these clubs range in age from eight to twenty-five years, but most are between twelve and eighteen years old. The following summarized table sets forth the facts regarding the individual clubs in the briefest possible form. In some cases definite information is wanting as the distribution of stock had not been com-

pleted at the time of compiling this report. Nevertheless each of these clubs is a reality and good results are being accomplished in both the new and old organizations. The prices paid for stock vary according to the kind of animal, its age, pedigree etc., but in all cases members secured good value for their money, and the recent calf club sale held in Halton County gives evidence of the fact that members are well satisfied with the results of their club work.

BOYS' AND GIRLS' CLUB WORK.—CALF, SHEEP AND PIG CLUBS, 1919.

County	Name of Club	Date of Organization	Membership	Breed of Stock, (Pure Bred or Grade)	Age of Stock when Distributed
Brant....	Brant Co. Boys' and Girls' Live Stock Club.	In process of organization.	10	Pure bred of all stock	Cattle-16-20 mos. Pigs -2-3 mos. Sheep—shearing.
Dufferin.....	Grand Valley Pure Bred Yorkshire Pig Club.	Nov. 1918	10	Pure bred Yorkshire sows, (bred)	6-8 mos.
	Melancthon Tp. Pure Bred Yorkshire Pig Club.	Mar. 1919	13	Pure bred Yorkshire sows (bred).	6-9 mos.
	Amaranth Twp. Pure Bred Pig Club.	Feb. 1919	14	Pure bred Yorkshires.	6-10 weeks.
	Dufferin Co. Shorthorn Calf Club.	Feb 1919	10	Pure bred Shorthorn females (bred).	18-36 mos.

BOYS' AND GIRLS' CLUB WORK.—CALF, SHEEP AND PIG CLUBS, 1919—*Concluded.*

County	Name of Club	Date of Organization	Membership	Breed of Stock, (Pure Bred or Grade)	Age of Stock when Distributed
Dundas.....	Finch Pig Club.....	Mar. 1918	46	At least one pure bred.	6 weeks.
Essex.....	Essex Co. Boys' & Girls' Pig Club.	May 1919	47	Duroc Jersey (grade).	2-3 mos.
Grenville.....	Grenville Co. Holstein Calf Club.	Apr. 1919	14	Pure bred holstein..	2-3 years.
Grey.....	Ravena Pig Club. . . .	May 1919	26	Pure bred Yorkshire	6 wks-6 mos.
Haldimand....	North Cayuga Boys and Girls' Pig Club.				
Halton.....	Halton Co. Shorthorn Calf Club.	Dec. 1918	28	Pure bred Shorthorn..	8-12 mos.
Kent.....	Fletcher Boys and Girls Shorthorn Calf Club.	June 1918	10	Pure bred Shorthorn..	Calves 6-16 mos. (bred) heifers, 2 yrs. old.
Lennox & Addington	Lennox & Add. Pig Club	Mar. 1918	49	Pure bred Yorkshires.	6-10 weeks.
	Lennox & Add. Pig Club...	Mar 1919	21	Purebred Yorkshire..	6-10 weeks.
	Lennox & Add. Calf Club..	Mar. 1919	12	5 pure bred Shorthorns 7 pure bred Holsteins	Under 6 mos. Under 6 mos
Peel.. . . .	Ebenzer J.F.I.A. Pig Club Peel Co. Calf Club.	June 1918	8	Yorkshire pure bred.	7-8 mos.
		Sept. 1918	58	10 Holstein P.B. 26 Holstein Grade. 8 Ayrshire Grade 11 Jersey, P.B. 3 Jerseys, Grade.	20 to 24 mos. (bred).
	Caledon Sheep Club..	Nov 1918	14	Oxford Pure Bred.	Shearling ewes, (bred).
Victoria... .	Victoria Co. Pig Club ..	June 1918			
Waterloo.	Waterloo Co. Boys' and Girls' Livestock Club.	Mar. 1918	14	All pure bred. 3 Shorthorn heifers. 7 Yorkshire sows. 1 Berkshire sow, 2 Ayrshire heifers. 1 Clydesdale mare.	8 mos.-2 yrs. 6 weeks, 6 weeks, 1½ years.
Welland.....	Welland County Shorthorn Calf Club.	July 1919			
Wentworth.....	Wentworth Pig Club ...	May 1918	40	Grade Yorkshire. . .	6-8 weeks.

The following table is a summary of the live stock club work among the boys and girls in the various counties in Ontario. The total number of clubs is twenty-two with a total membership of four hundred and forty-four, which is an average of twenty members for each of the twenty-two clubs.

BOYS' AND GIRLS' CLUBS.

Pig Clubs—

Yorkshire.....	Dufferin.....	3
	Dundas.....	1
	Grey.....	1
	Haldimand....	1
	Lennox and Addington.	2
	Peel.....	1
	Victoria. . . .	1
	Wentworth...	1
Duroc-Jersey.....	Essex.....	1

Calf Clubs—

Ayrshire.....	} Peel.....	1
Jersey.....		
Holstein.....		
Holstein.	Grenville....	1
Holstein and Short- horns.....	Lennox and Addington.	1
Shorthorns. . . .	Dufferin.....	1
	Halton. . . .	1
	Kent.....	1
	Welland.....	1

7

Sheeps Clubs—

Oxford.....	Peel.....	1
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Live Stock Clubs—

Brant.....	1
Waterloo.....	1

2

MANITOBA

BOYS' AND GIRLS' CLUB FAIRS

DURING the first three weeks of October two hundred and forty boys' and girls' fairs are being held throughout the province and all parents and friends of Manitoba's 25,000 club members are invited by the Ministers of Agriculture and Education to attend at least one of the fairs and see what the young people are doing to develop agriculture--the world's greatest science,—and home making—the world's greatest occupation. Posters used by the Agricultural Extension Service of the Manitoba Department of Agriculture, Winnipeg, announce the dates of the various fairs under the inspectors of the different division and set the following time table, which is uniform for all fairs.—Farmers' Time.

- 9 30—All Club Officers at their posts.
- 10 30—All Exhibits in place.
- 11 00—Judging commences.
- 11 00—Boys' and Girls' Matches. Baseball, Football, etc.
- 12 30—Basket Picnic—school groups.
- 1 30—Judging continued.

- 1.30—Potato, Carrot, Bean, Sack and Three-legged races, 50, 75, 100 yd. dashes, obstacle, relay and other races.

3.00—IDENTIFICATION COMPETITION. For Club Members.

Only those two have at least two exhibits at the Fair are permitted to compete. Each team will consist of either two boys and one girl, or two girls and one boy from a rural school or from a room in a graded school.

The members of each team who get 80 points out of 100, or the individual who gets 90 points, will receive the beautiful gold filled enamel Club Emblem presented by the Minister of Agriculture. The winning team will also receive a Boys' and Girls' Club Diploma.

Each Competitor is required to name the following, either from pictures, drawings or live specimens:—

- 1. Five common Manitoba breeds of Poultry.
- 2. Five common Manitoba breeds of Pigs.
- 3. Five common Manitoba breeds of Cattle.
- 4. Five common Manitoba breeds of Sheep.
- 5. Five common Manitoba breeds of Horses.
- 6. Eight common Manitoba Field Grains.
- 7. Eight common Manitoba Noxious Weeds.
- 8. Eleven common Manitoba Garden Vegetables.

Score cards will be provided by the judges.

- 3 30—Judges explain the awards.
- 4 00—Speeches, Drills, School Yells, Community Singing.

SASKATCHEWAN

FARM BOYS' CAMP

THE Farm Boys' Camp at the Regina Provincial Exhibition was this year more than usually successful. The premier award of a fifty dollar agricultural scholarship and twenty-five dollars in cash was awarded to Fred. Black of Midale who scored the highest aggregate in all the competitions staged during the camp. The Midale team scored the highest points in the beef and dairy cattle judging competitions and with 1,788 points to its credit secured the highest standing of the forty-eight teams competing. The

prizes were presented to the winning boys and teams in the live stock judging grand stand by J. G. Rayner, of the University Extension Department, the camp manager.

The physical training and manual work during the week the boys were in camp was undertaken by T. H. Rosser, principal of the Shellbrook school, who also acted as camp commandant. On the closing day the boys paid a visit to the parliament buildings where they were addressed by the Honourable Charles A. Dunning, Minister of Agriculture.

BRITISH COLUMBIA

EDUCATION IN AND THROUGH AGRICULTURE

BY J. W. GIBSON, M.A., DIRECTOR OF ELEMENTARY AGRICULTURAL EDUCATION

IN the June number of the Gazette Mr. John Dearnness, in his most timely article on "Agriculture as Education", points out some of the dangers and also some of the errors attendant upon the introduction of agriculture in the schools. The case has not been overstated. Agricultural instruction can hardly be said to have more than begun in the schools of Canada and already one sees evidences of mischief and impending failure, chiefly, we think, through a lack of understanding combined with the misdirected enthusiasm of some of its strongest supporters. What we seem to need and need badly is a philosophy of agricultural education. Education *in* Agriculture is comparatively easy of understanding. "Let us have Agriculture taught in our schools", is the slogan, and many who know more about agriculture than about the true function of schools are leading rashly and blindly on. In too many cases they mistake the *means* for the end. They have not grasped the important fact that in the public schools, at least there is one thing more important than education in agriculture and that is education *through* agriculture.

At various times during the last half century attempts have been made to introduce the study of agriculture in the public schools of Canada. The supposition was that agriculture was something that children would do well to know about, hence it never got beyond the stage of good and useful information, dispensed from text-books with a certain amount of doubtful exposition thrown in. Indeed, the instructions issued to teachers in Ontario in 1896, relative to the teaching of agriculture in public schools, specifically stated that the teaching of this subject was to be "by conversation only." Of course Ontario and the other provinces have got well beyond that

stage in the teaching of agriculture but there is a grave danger of our making another mistake and that is what Mr. Dearnness has taken occasion to point out. The whole question is too serious and too important to be passed over. There is a right way and we may be sure that it is based upon sound pedagogic principles.

How many teachers of agriculture ever stop to consider the great question of the evolution of interest in children? "If it is a good thing to know, then the sooner they learn it the better", seems to be the theory of some agricultural instructors. But this is wrong in principle and can never be permanently successful. For example, the scientific feeding of hogs is a fine study and the economic production of pork is a splendid achievement, but it properly belongs to young men and not to little boys and girls of junior or intermediate grade. A certain kind of agricultural propagandist in Canada has failed to recognize or appreciate this fact and the sudden popularity which now attends all efforts on the part of the schools to increase food production seems to give him right of way in the schools. Under war conditions we felt that this should be tolerated and even encouraged, but it is now time that school inspectors and superintendents should think their way through this question of agriculture in the schools and get on to a sound basis of education both in and through agriculture.

Agriculture has wonderful possibilities as a great liberalizing subject of instruction. It stands so close to the first interests of the human race that it is destined to occupy a most important place in the educational systems of the future, but it will never become the great factor and the fine instrument in education which it can and should be unless it is properly organized and intelligently handled.

It has its beginnings in primary education in a direct observational

study of the things that surround the children and which enter into their daily experience and activity. It includes a knowledge of the plant and animal life of the district and of the soil and later of the processes entering into plant production. Probably no single phrase or term adequately expresses all that we wish to include in the elementary work which logically precedes vocational and economic agriculture, but certainly "nature study" as we understand it today most nearly expresses what we mean. The true teacher who has learned to think with the children and to appreciate their mental processes and above all the normal development of their interests, attitudes, and tendencies, makes no dividing line between nature study and agriculture. She thinks of agriculture as nature study specialized and applied--and as it becomes more specialized and operative it obviously may become more economic and vocational. It is not altogether a question of age or of grade, but in the main Mr. Dearness is right in his conclusion that "in the public schools there is very little of agriculture that should not be taught with a liberalizing and socializing aim as nature study."

Nature study with domestic animals is not agriculture but it is a most desirable introduction to the animal husbandry side of agriculture. Pigs are most interesting animals for observational study for little boys and girls but the butcher's verdict on the

animal is a highly economic consideration which is more appropriate to developing adult interest and can best be dealt with in senior grade or high school work. In the public school we can afford to have more "piggy" and less "pork".

And what about our Pig Clubs? It is a fine thing to interest boys and girls in the feeding and care of pigs and other animals. They learn much of animal peculiarities and of their response to good care--in the matter of friendship quite as much as of increasing avoirdupois. They get a certain amount of business training and may even develop some skill in the mixing of rations but to the little boy of ten pig clubs are mainly nature study clubs and to the big boy of eighteen they are young farmer's pork raising clubs. The little boy manages to fatten up his pet in order that in its death both he and it may make a record for the country or for the province and receive in connection therewith a big prize and a halo of glory. There is something incongruous about this whole performance. Why can we not have nature study clubs as fine, educational organizations for boys and girls of public school age and good, up-to-date, well-managed Junior Farmers' Agricultural or Production clubs for boys from fifteen to twenty years of age? At present we are trying to be all-inclusive in our agricultural programme, to the detriment of permanency of interest and of good pedagogy.

Every building of permanency requires a well built foundation. It is equally true that the growing boys and girls require a firm foundation upon which to base a successful career. The school fair aims to develop in the boy and girl the corner stones of ambition, self-reliance, carefulness and a love of Nature.

PART IV

Special Contributions, Report of Agricultural Organizations, Publications, and Notes

ASSOCIATIONS AND SOCIETIES

EVENTS OF THE COMING MONTHS

- Oct. 6-12.—National Dairy Show at Chicago, U.S.A., Secretary, W. E. Skinner, 405 State Building, 5th Ave., Chicago.
- Oct. 8-15, General Stock Breeders' Association of the province of Quebec tenth annual sale of pure bred registered breeding stock at Montreal Eastern Cattle Market, October 8th, and Quebec Abattoirs (cattle market) October 15th. Secretary, Dr. J. A. Couture, 49 Garden St. Quebec.
- Oct. 14, 15, 16 Interprovincial Ploughing Match, Tractor and Farm Machinery Demonstration at the Central Experimental and Booth Farms, Ottawa. Secretary, F. C. Nunnick, Ottawa.
- Oct. 29—Nov. 3.—Provincial Fair, New Westminster, B.C.
- Jan. 8-9, 1920; Dairymen's Association of Eastern Ontario hold their winter dairy exhibition at Brockville, Ontario. Secretary, T. A. Thompson, Almonte, Ont.
- Jan. 14-15, 1920, Dairymen's Association of Western Ontario hold their winter dairy exhibition at London, Ontario. Secretary, Mr. Frank Hens, London Ont.
- Feb. 16-21, 1920, Western Canada Dairy Show and Manitoba Dairy Association Convention at Winnipeg. Secretary, L. A. Gibson, Parliament Buildings, Winnipeg.

CENTRAL CANADA VETERINARY ASSOCIATION

At the Central Canada Veterinary Association clinic held in Ottawa, August 13 and 14, a large number of veterinarians from central Ontario, and several from Montreal, were present. Among the resolutions which passed were the following:—

That this association hereby request the government of Ontario to enact legislation requiring the registration of veterinary surgeons for practice, similar to the laws now existing in the other provinces of Canada.

That this association expresses its strong disapproval of any institutions other than recognized universities and accredited veterinary colleges giving courses of instruction in veterinary science by mail or

otherwise and granting so-called diplomas and degrees.

WHEREAS the Minister of Agriculture of Ontario has announced that the Ontario Veterinary College has now adopted a definite standard of matriculation and the granting of the degree of Bachelor of Veterinary Science by the University of Toronto; and

WHEREAS this association is convinced that this will insure a higher standard of veterinary qualification.

THEREFORE be it resolved that this association avail itself of this opportunity to convey to the Hon. Geo. S. Henry, the Minister of Agriculture, its assurance of its appreciation of his action in arranging for a higher standard of veterinary education and qualification.

THE POMOLOGICAL AND FRUIT GROWING SOCIETY OF QUEBEC

There was a large attendance at the meeting of the Pomological and Fruit Growing Society of the province of Quebec which met at Hemmingford for their summer conference. The necessity of re-planting the orchards of the province after the killing frost of 1917-18, with their subsequent mortality in the best orchards of Quebec,

was dealt on by the President, Mr. C. E. Petch, in his opening address and was emphasized by the speakers. Tremendous losses had occurred but the devastating winter has shown that orchards of suitable varieties, properly cultivated, can withstand even such winters as that of 1917-18. To this end the re-planting of orchards with

fameuse, Macintosh Reds, Wealthy, and Duchess apples was advocated. These four varieties have been found particularly suited for the districts of Quebec.

With regard to the plum growing industry of the lower gulf regions Dr. Chapais, Kamouraska County, pointed out that such losses as the one above referred to occurred but once in a generation and the proceeds from the intermediate crops was amply sufficient to make up for the losses. He advised that proper varieties of plums be chosen, planting gone ahead with, and orchards re-planted and cared for in such a manner that they might resist severe frosts.

In his address on garden pests Professor Lochhead of Macdonald College outlined

methods for the extermination of the insect and fungus pests which are most troublesome in the orchard.

Professor T. G. Bunting of Macdonald College in his address on improving the home surroundings advocated the planting of flowers and shrubs to add to the beauty of the ordinary country home.

Father Leopold of LaTrappe, advised a vigorous policy of replanting to restore the orchards of Quebec to their former productiveness.

The officers of the Association are, President, C. E. Petch, B.S.A., Hemmingford; vice-president, Rev. J. P. Levasseur, Ste Anne de la Pocatiere; secretary-treasurer, Peter Reid, Chateauguay Basin.

QUEBEC HOMEMAKERS' CLUB

At the sixth annual convention of the Homemakers' Clubs held at Macdonald College in June, eighty-three delegates were in attendance representing thirty-nine out of the forty-five clubs now in existence. In his address of welcome Professor Lochhead referred to the great changes which had taken place since the annual meeting last year. He pointed out that the new conditions and the process of readjustment presented many difficulties but he believed that eventually we would emerge with grievances settled and inequalities of all kinds would be eliminated. In his opinion, the main objective of the new policy in rural reorganization should be co-operation for the common good and the women of the country must be

looked to to take a leading part and the homemakers' clubs wield a great influence in rural communities. A survey of the club programmes showed that history, literature, matters of government and community improvement had received attention as well as questions pertaining to health and the household. During the past year the importance of the question of food was indicated by the fact that food studies were shown on the programmes of the various clubs. Ten new clubs have been formed in the province during the past year: Fort Coulonge, Wakefield, Milan, Bury, Marsboro, Massawippi, Hillhead, Jerusalem, Radford and Ways' Mills. Two clubs, Eardley and Hemmingford, have been reorganized.

ONTARIO AGRICULTURAL AND EXPERIMENTAL UNION

The next annual meeting of the Ontario Agricultural and Experimental Union will be held at the Ontario Agricultural College on January 20th and 21st. The secretary

of the association is Dr. C. A. Zavitz, professor of Field Husbandry at the Ontario Agricultural College.

ONTARIO VETERINARY ASSOCIATION

The annual meeting of the Ontario Veterinary Association was held at the Ontario Veterinary College, Toronto, during the second week in August. The association adopted resolutions recommending that to prevent illicit dealing in drugs by persons representing themselves as veterinary surgeons, the official registration of the duly qualified veterinarians be required by law; that the Ontario Veterinary Association request the government to enact legislation to prevent veterinary quackery and establish standards for Ontario similar to those existing in other provinces; that an investigation be instituted and all privately conducted veterinary correspondence schools be prohibited, thus reserving to the Ontario Veterinary College, universities and agricultural colleges the right to give veterinary training

and instruction. It was claimed that veterinary science is being brought into disrepute owing to the number of practitioners being turned out from so called veterinary correspondence schools every year. The present law is such that they can and do practice in many localities with little hindrance. The association wishes to eliminate all quacking in veterinary science in Ontario.

The election of officers of the Ontario Veterinary Association for the ensuing year resulted as follows: President, Dr. Campbell, Toronto; 1st vice-president, Dr. Engel, Waterloo; 2nd vice-president, Dr. Cook, Toronto; secretary-treasurer, Dr. Ottewell, Toronto; Executive committee, Dr. Buckley, Toronto; Dr. Baker, Toronto; Dr. Caley, Bracebridge.

ONTARIO BEEKEEPERS' ASSOCIATION

At the meeting in Toronto the crop report committee of the Ontario Beekeepers' Association received reports from 579 members in the province as well as information from Quebec and United States relative to this year's honey production. Indications show that the light honey crop this year is below normal both in Ontario and outside

territories and so far as can be ascertained there is no large amount of last year's crop held over. In view of these conditions the committee recommended the same prices as last year and were advised to cultivate their home market to its fullest capacity, being careful not to sell any second grade honey for table use.

DAIRYMEN'S ASSOCIATION OF ONTARIO

The Dairymen's Association both of western and eastern Ontario are preparing for their winter exhibition at Brockville, Ontario, and London, Ontario. The prize lists for both exhibitions are large and besides the Association prizes many excellent, special premiums are offered. All entries must be in the hands of the secretary on or before December 15 and exhibitors must be members of the Association for the year 1919. Creamery prints and dairy butter may be made any time after October 1

and do not necessarily need to be forwarded to cold storage, but the fifty-six pound boxes of creamery butter must be forwarded within one week after making and the secretary notified as to the day of shipment for the Brockville exhibition. For the London exhibition all October butter must be sent to London cold storage by November 11. Exhibitors of cheese are required to care for their own exhibits until shipped to the place of the convention.

NIAGARA DISTRICT GRAPE GROWERS' ASSOCIATION

The Niagara District Grape Growers' Association, which was formed on August 18 at St. Catharines with an initial membership of 300, aims to eliminate profiteers. It will make amicable arrangements between the growers, the wine manufacturers, and the dealers and will endeavour to equalize the price on a fair basis to the growers, the wholesaler, the retailer, and the eventual consumer.

The election of officers was as follows: President, J. A. Welstead, St. Catharines; vice-president, James A. Livingstone, Grimsby; secretary-treasurer, Harry K. Clemens. The executive committee consists of the following representatives of local associations: St. Davids, W. W. Armstrong, J. N. Crysler; Beamsville, James C. Cox, John Hicks; Jordan, W. M. Gayman; Winona, Eland Lee, Thomas Mahoney; Grimsby, James Livingstone.

MANITOBA DAIRY ASSOCIATION

The Manitoba Dairy Association has raised \$340 to be offered in prizes at the Western Canada Dairy Show, for the best fourteen pounds of butter made during the month of September. The butter shall be

cold stored in Winnipeg until judging times arrives in February, 1920. The prizes offered are eight in number, ranging from \$100 to \$10.

SASKATCHEWAN STOCK GROWERS' ASSOCIATION

At the seventh annual convention of the Saskatchewan Stock Growers Association held at Swift Current in June the secretary's report showed that the Association had been very

active during the past year. The resolutions passed at the last annual meeting had been carried out satisfactorily. By a special Act of legislature two stock yards, one at

Moose Jaw and one at Prince Albert, had been organized with a capital cost of \$100,000 each. The Moose Jaw Union Stock Yards Limited dropped its charter and accepted the charter provided by the Act of the Legislature. The assets of the Moose Jaw Union Stock Yards Limited were transferred to the Southern Saskatchewan Co-operative Stock Yards Company. The resolution asking for conservation of feed on farms until April 1st each year had been practically carried out. The charter incorporating the Association by Act of parliament was secured, capital being \$1,000 and the number of shares 1,000.

Among the recommendations made at the convention were the following resolutions:—

That the Association respectfully request the Dominion Government to investigate the coal resources in the Willow Bunch district with a view to operating. That when the stock yards of Moose Jaw and Prince Albert commence operations an agent be appointed by the Saskatchewan Department of Agriculture to purchase breeding stock and stockers for farmers as is now practised at St. Boniface, Man.

That the Recorder of Brands notify owners of horse and cattle brands in regard to expiration of their brands so that such owners may take the necessary steps to have their brands renewed. This resolution refers to section 4 of the Brand Act.

That section 17 of the Brand Act be amended by making the penalty read "Minimum \$50.00 and not exceeding \$300.00."

That, in the opinion of this Association, in any municipality where there is an appreciable amount of rough land abutting on a river mostly used for stock purposes the Municipal Act should be amended in order that the majority of this portion of the municipality should be able to take a vote as to whether a winter herd law should be put in force or not.

Considering the vast area of the province of Saskatchewan the Association believes that the time is opportune for the establishing of a demonstration farm in the south western portion of the province. The said farm to be under government control as an adjunct to the agricultural college at Saskatchewan. Furthermore that a copy of this resolution be forwarded to the Hon. Wm. Martin, Minister of Education, for his information and action.

Resolved that the Association would respectfully request the Dominion Government to set apart a suitable area of land in the south western part of the province to be used by the University of Saskatchewan for demonstration purposes in methods of breeding, feeding, and caring for stock under range conditions.

Shaunavon, Sask., was unanimously chosen as a place for meeting for the convention in June, 1920.

The election of officers for the ensuing year was as follows. —President, Jack Byers, Valjean; vice president, Olaf Olafson, Mortlach; secretary, Hugh McKellar.

GREAT PLAINS OFFICIAL HORTICULTURIST ASSOCIATION

The second annual convention of the Great Plains Official Horticulturist Association was held at Winnipeg, Brandon, Morden, and at Indian Head, in August, 1919. The party consisted of delegates from various parts of Canada and the United States.

Under the direction of Mr. W. C. McKillican and his gardener the party inspected the Brandon Farm where some interesting tests in the culture of tomatoes were being carried on. In sweet corn the Sweet Squaw, a Central Experimental Farm production, is giving promising returns. In the orchard a number of cherries, plums, and apples were seen to be giving fair satisfaction and proving sufficiently hardy for the western provinces. The sand cherry and the Japanese Hybrid produced by Professor Hansen were bearing fairly abundantly. The Mammoth plum, a production of Mr. A. P. Stevenson, a seedling of the Cheney, was found to be perfectly hardy and bearing well. Two of the hardiest varieties of apples were Osman and Columbia. One of the lilacs giving best satisfaction under general prairie conditions was the villosa lilac which was seen in the arboretum at the farm.

At the Experimental Farm at Indian Head the party, under the direction of Superin-

tendent McKenzie and Professor Macoun, spent a profitable morning in the gardens and orchards and arboretum and compared the relative hardiness, at this point, of the various types and varieties, as they had done at Brandon the day before. A visit to the Forestry Station where Mr. Norman Ross, Superintendent, took charge of the party, was of special value to those interested in beautifying the farm homes of the Prairie Provinces. At this station Mr. Ross is producing deciduous and coniferous tree seedlings by the million for prairie farms and he deserves credit for the remarkable way in which he has developed a treeless prairie farm into a place of great beauty. Some of the outstanding varieties of trees for prairie planting are Black Bills Spruce, Siberian Larch, Lodgepole and Scotch Pine.

The regular session of the convention was held at the Manitoba Agricultural College where the members of the association were welcomed by President Reynolds. The secretary in his report pointed out that the association had just been formed one year previous and had under consideration the development of a hundred year programme in the evolution of hardy plants for the Great Plains region. One of the objects of the association is to make life on the prairies

more homelike and attractive and this object is being kept well in mind.

The final session of this second convention was held at the Experiment Station at Morden, Manitoba, where some interesting work is under way in testing out new and promising varieties of seedling apples and plums. Some of the new seedling apples which have been produced at Ottawa by making a cross of hardy standards on the Saunders Hybrids were in bearing and aroused considerable interest.

The second annual meeting of the association has proven a decided success and has served to emphasize these facts:

1. That the horticulture of the Great Plains Region is one of international importance and the problem can best be solved by co-operative and co-ordinated effort.

2. That the work of developing fruit and vegetables for this region is a problem that will require long periods of time, and is a problem that should receive the support of governments and public bodies.

3. That this region is capable of great horticultural possibilities.

4. That these annual gatherings are an excellent means of arousing a widespread interest in this question.

It was decided to allow the association to remain largely of a technical nature retaining as active members all those who are engaged in horticulture in an official way in the Great Plains region, and accepting as associate members those whom the executive might consider eligible. On invitation from Mr. M. J. Dorsey it was decided to hold the next meeting at St. Paul, Minn.

The following officers were elected for the ensuing year: President, Professor F. W. Brodrick of the Agricultural College at Winnipeg; secretary-treasurer, Max Pfander, Mandan, North Dakota; directors, Dr. M. J. Dorsey, University Farm, St. Paul, Minn.; Professor W. T. Macoun, Dominion Horticulturist, Ottawa, Can., and Professor N. E. Hansen, Brookings, South Dakota.

WESTERN CANADA IRRIGATION ASSOCIATION

The thirteenth annual convention of the Western Canada Irrigation Association was held at Medicine Hat, Alberta, August 4, 5 and 6. The convention was a very successful one in every way. It was well attended, the addresses were interesting and the discussions valuable. The strong feeling of the meeting was the need for more irrigation in Southern Alberta and parts of Saskatchewan. There are few opponents of irrigation in these parts of the country now and it was not necessary to prove its value and advantages. If there had been any doubters, their doubts would have been dispelled by the visit to the Ronalane Farm, owned by the Canada Land and Irrigation Company where the delegates were invited to spend a day. The wonderful crops seen on this farm and contrasted with the surrounding prairie would have convinced the most skeptical. At the farm a practical demonstration of the preparation of land for irrigation and the various means of applying water was given and was followed with much interest by the visitors.

The papers and discussions dealt with various phases of irrigation both from the point of view of the engineer and that of

the farmer, and led to very animated discussions. Very strong resolutions were passed at the close of the convention urging on the Dominion and provincial governments the need of immediate action in the extension of irrigation throughout Southern Alberta and parts of Saskatchewan. A very heated discussion arose as to the responsibility of Dominion and provincial governments in the construction of these works and a resolution was passed expressing the opinion that it was the duty of the Dominion government to maintain all main canals and reservoirs and deliver water at cost and that the provincial governments concerned should assume the responsibility for creation of water districts and lend their financial support to these districts.

In view of the importance of the extension of irrigation throughout Southern Alberta, the British Columbia and Saskatchewan, representatives at the convention agreed to forego their right to having next year's convention in their province and a resolution was moved and seconded by representatives of these provinces respectively that next year's convention be held at Lethbridge.

ABERDEEN ANGUS ASSOCIATION

Aberdeen-Angus breeders from Ontario, Manitoba, Saskatchewan, and Alberta attended the Canadian Aberdeen-Angus Association meeting recently held in Brandon, Manitoba. The attendance numbered over seventy. The recommendation that the association adopt the policy of holding contribution sales of stock in different parts of

the country was approved. The national sales' committee was appointed to co-operate with the provincial associations in arranging for and holding these sales. The futurity or calf class, which this year proved such a success at the Brandon exhibition, is to be a yearly affair at different exhibitions throughout the country. In his opening address

President J. D. McGregor drew attention to the progress that has been made by the association in the last ten years. In 1908 registrations were about 500 with a revenue

amounting to \$800 while in 1918 the registrations were nearly 4,000 and the revenue was over \$6,000.

BRITISH COLUMBIA CO-OPERATIVE SEED GROWERS'

The United Seed Growers' Co-operative organization, with headquarters at Penticton, B.C., has been launched. It is the intention of this association to make a serious attempt to gain a prominent place in the Canadian seed trade. The United Seed Growers will operate under the Co-operative Associations Act of the province and will have their storage warehouse at Penticton. During the past two years considerable work has been undertaken to increase the British

Columbia seed industry and the results encourage a continuance of this work. The principal object of the United Seed Growers' is better returns for their seeds. The margin existing at present between the price the growers receive and that at which the retailers sell is not equitable.

At the preliminary meeting held at Penticton, the president chosen for the organization is L. E. Taylor of Kelowna, B.C., vice-president, W. C. Kelly, Summerland, B.C.

NEW PUBLICATIONS

DOMINION DEPARTMENT OF AGRICULTURE

Pamphlet No. 19, Information Concerning the Policy regarding Pure-Bred Rams issued by the Live Stock Branch of the Dominion Department of Agriculture, Ottawa, gives information regarding the premium policy adopted by the Live Stock Branch.

Preservation of Fruits and Vegetables for Home Use by Margaret Macfarlane, Bulletin No. 93 of the Dominion Experimental Farms, contains information in regard to the general principles underlying the successful preservation of food based on recipes found by long experience to be good and on experimental work at the Experimental Farm during 1917-18.

Bulletin No. 40 *The Use of Coarse Grains for Human Food*, by Dr C. E. Saunders, Dominion Cerealists, in a most interesting way treats of the possibilities and advantages of adding to human diet various articles of food prepared from coarse grains, and includes a number of recipes for preparing these.

Bulletin No. 38, *Second Series, Flue-Cured Tobacco in Canada*, prepared by the Tobacco Division of the Dominion Department of Agriculture, contains results of experimental work at the tobacco station at Harrow of which D. D. Digges is Manager. The information is supplemented by the report of investigations of tobacco soils in southern Ontario made by H. J. Freeman, Tobacco Inspector.

ONTARIO

Autumn Sown Crops 1919 by C. A. Zavitz, Professor of Field Husbandry, Ontario Agricultural College, Guelph, gives results of experiments with winter wheat, rye,

barley, emmer and hairy vetches conducted at the Ontario Agricultural College and on various farms throughout Ontario.

The Apple Maggot, Bulletin 271 by L. Caesar, B.A., B.S.A., Provincial Entomologist and W. A. Ross, B.S.A., Entomological Branch, Dominion Department of Agriculture, is issued by the Fruit Branch of the Ontario Department of Agriculture. This bulletin gives full information regarding the apple maggot, its history, distribution, food plants, economic importance, life history, and methods of control.

Bulletin No. 252.—*The Preservation of Food*, issued by the Ontario Department of Agriculture deals with the importance of preserving food in the home, and contains a number of methods for canning and jelly making, as well as telling in detail how to preserve vegetables and fruits by drying and cold storage.

Circular No. 23 Why it Will pay You to Plant certified seed potatoes grown in Northern Ontario, prepared by Justus Miller, B.S.A., Field Crop Specialist, and issued by the Ontario Department of Agriculture, explains how the northern grown seed is prepared and certified, gives official standards of certified seed potatoes, and identifies the varieties of potatoes recommended for planting.

Bulletin 273 *Community Halls*, issued by the Ontario Department of Agriculture, states the Act respecting the establishment of community halls and athletic fields in rural districts together with the regulations passed under the Community Halls Act of 1919, and gives information regarding the establishing of these halls. It also contains plans of various types of community halls suitable for rural communities.

Bulletin 247 Farm Poultry issued by the Ontario Department of Agriculture is a revised edition of Bulletin 217, prepared by Professor W. R. Graham and F. N. Marcellus. This bulletin of eighty pages contains valuable information for poultry raisers and gives the results of some experiments of poultry houses and fattening of chicks.

MANITOBA

The Annual Report of the Department of Agriculture and Immigration of the province of Manitoba for the year 1918 contains the reports of the heads of the various departments of the government. Under separate covers are published the report of the Manitoba Agricultural College and the report of the Agricultural Extension Service.

SASKATCHEWAN

The Twelfth Annual Report of the Secretary of Statistics for the fiscal year ended April 30, 1919, issued by the Department of Agriculture of the province of Saskatchewan, contains the final statistical report of Saskatchewan's grain crops, live stock and, grain marketing, and gives meteorological data for the calendar year 1918.

BRITISH COLUMBIA

The Thirteenth Annual Report of the Department of Agriculture for the year 1918, issued by the province of British Columbia, contains one hundred and ten pages, and includes the reports of the various branches of the Department of Agriculture for that province.

The Eighth Annual Report of the Agricultural Fairs Associations of British Columbia for the years 1917-18, issued by the Department of Agriculture of British Columbia, contains reports of fairs conducted by the Department in the five circuits in the province. An appendix contains a summary of grants, receipts, expenditures, membership and prize money, etc., for the years 1914-18.

The following bulletins have recently been published by the Manitoba Department of Agriculture and Immigration. Extension Bulletin No. 37 "*Farm Butter Making*"; No. 38 "*Practical Cookery*"; No. 39 "*Books for the Farm and Home*"; and No. 40 "*Home Dressmaking*".

MISCELLANEOUS

Manual of American Grape-Growing, by U. P. Hedrick, is a complete, popular book on grape growing in North America. It describes the practical questions of climatic limitations, choice of site, land and its preparation, fertilizing, tillage, planting, pruning, training, and marketing. It outlines concise treatment of diseases and insects injurious to the crop, and gives special attention to descriptions of leading commercial and amateur varieties.

The Minutes of the Annual and Directors' Meetings of the Canadian Ayrshire Breeders' Association for 1918 contains the constitution, by-laws, rules of entry, scale of points, and rules and regulations for Record of Performance in this association.

NOTES

In the state of Michigan fifty-seven county agents report work with boys' and girls' clubs. Steps have been taken to relate this work in an organized way more closely to the farm bureaux.

In all two-roomed rural school buildings and in many of the better one-roomed schools in Saskatchewan space is provided which can be used for agricultural purposes.

At the executive meeting of the Alberta Provincial Poultry Association held in Calgary in July, it was moved that the provincial government be requested to start an egg-laying contest in the province of Alberta not later than the fall of this year.

At the 1919 session of the Manitoba Horticultural and Forestry Association standards for judging vegetables were adopted. These standards are stated in detail for each kind of vegetable listed. Quality and uniformity with size suitable for table use are to govern all awards.

The Department of Agriculture for the province of Alberta is appointing inspectors to examine eggs in trading places. These inspectors will have the power to institute proceedings for violations of the Act respecting the produce and the sale of eggs which was passed at the last session of the Alberta legislature.

The annual convention of the Vegetable Growers' Association of America, was held in Detroit, Mich., September 9 to 12, 1919. The programme included numerous addresses on co-operation, market gardening, greenhouses, soils, fertilizers, etc., by leading officials from the United States and Canada.

A horticultural exhibition which had been developed to splendid proportions before the war and which includes fruit, flower, and honey interests is to be revived this year. The dates chosen are November 11 to 15 inclusive. Complete announcements as to prize lists are being prepared and will be announced in the near future.

A number of Canadian Holsteins are being taken from British Columbia to Australia for Major Finlay of the Sydney University. These animals have all been bought from British Columbia breeders by Mr. J. F. Simmonds, Colony Farm, Essondale, B.C., who believes that these Canadian cows will make a good name for themselves in New South Wales. At the present time the Holstein is practically unknown in that region.

Although the order issued by the Canada Food Board prohibiting the burning of straw was rescinded last fall there will be very little oat straw burned in Saskatchewan this year. The Saskatchewan farmers, having straw for sale are desirous of getting in touch with stock men who require the straw and will pay a nominal price for it. The Live Stock Commissioner for Saskatchewan is desirous of hearing from farmers who have oat straw for sale.

In order to prevent the further introduction of "Take All" and "Flag Smut" into the United States, the Secretary of Agriculture is prohibiting, absolutely, the importation of seed or paddy rice into the country, and he has issued regulations naming the conditions under which wheat, oats, barley, and rye may be imported from the countries where the grain is affected by these diseases. The order is effective August 15, 1919. Complete information regarding these diseases was given in the July number of THE AGRICULTURAL GAZETTE.

Miss Roberta MacAdams, soldier representative in the Alberta legislature, has been appointed district director of the home branch of the Soldier Settlement Board for Edmonton, Alta. Miss MacAdams is a graduate of Macdonald Institute, Guelph. She went overseas in 1915 and was on the staff of the Orpington Hospital and after her election in 1917 she made a tour, on the invitation of the Red Cross Society, of the hospitals of France. Both at home and

overseas she took a very active part in the welfare of the soldiers.

Mr. J. L. Tennant, B.S.A., superintendent of the underdrainage work in Prince Edward Island, and agricultural representative for Prince county in that province, has resigned and is attending the Graduate School of Cornell University, taking special work in agricultural education and associated subjects. Mr. Tennant, in addition to the general activities of an agricultural representative, conducted an underdrainage campaign through the experimental stage, and demonstrated its value in improving the low lying lands of the province.

At the meeting of the Calgary Poultry Association held in August, a revision was made to the rules and prize list for the coming winter show which will be held November 26 to 28. Rule 7 is amended by adding the following.

"All exhibits will be examined by the association's poultry specialist who will segregate any birds suffering from diseases or in an unfit condition. Such birds will not be permitted to participate in the competition but will receive every proper care and attention. Sick birds may be removed from the show building if the owner desires.

Demonstrations in canning, jam making, and pickling have been held at several centres in Quebec province under the direction of Miss Kirby, assisted by two domestic science students from Macdonald College. The demonstrations held at Shawville, Elmside, and Fort Coulonge were attended by the members of the girls' clubs who showed considerable interest in the work. In Shawville the academy was used for the meetings and the equipment in the household science department helped to lighten the work of demonstration. Both girls' clubs and women's clubs are showing great activity in different parts of the province and considerable encouragement and many good suggestions have been given them by the demonstrators.

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How to prepare Poultry for Exhibition. George Robertson, Assistant to Dominion Poultry Husbandman, Ottawa, page 7.

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A Land of Forests—Without Forestry. Dr. C. D. Howe, Faculty of Forestry, Toronto, in address to Toronto Board of Trade, page 1613.

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The Farmer's Magazine, Toronto, Ont.

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The Journal of Agriculture and Horticulture,
Quebec, Que.

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Co-operative Wool Marketing in Quebec, 1919. A. E. MacLaurin, Macdonald College Staff, page 50.

A Visit to the Seed-Growers' Co-operative at Ste. Rosalie. Chas. A. Fontaine, Agricultural Demonstrator of the County of Two Mountains, page 56.

The Maritime Farmer and Co-operative Dairyman, Sussex, N.B.

August 26.

The Value of the Pure Bred Dairy Bull in Grade Herd. E. S. Archibald, B.A., B.S.A., Director Experimental Farms, page 799.

The Nor'West Farmer, Winnipeg, Man.

August 5.

Preparing Butter for Winter Use. Norman James, B.S.A., Manitoba Agricultural College, page 1131.

PART V

The International Institute of Agriculture

FOREIGN AGRICULTURAL INTELLIGENCE

SCIENCE AND PRACTICE OF AGRICULTURE

GENERAL INFORMATION

411—**Agriculture and Sylviculture in Macedonia.**—TURRILL, W. B., in *Royal Botanic Gardens, Kew, Bulletin of Miscellaneous Information*, No. 8 and 9, pp. 253-254. London, 1918.

In Macedonia agriculture is practised only on a small proportion of the land and in a very primitive manner. Wooden ploughs drawn by buffaloes are used and all threshing is done by hand. In many places the soil is very fertile and gives good returns, even with the crude methods of cultivation employed. Tobacco is an important crop, and several kinds of fruit are grown.

There are no forests in Macedonia. Here and there isolated groups of trees may be found, but all forests have been destroyed by the Turks. So far very little has been done in growing young trees.

412—**Crop and Animal Production in Finland.**—GOOSEN, O., in *In-en Uilvar*, Sept., and Oct., 1918.

In 1914 Finland had a population of 3,269,401, two thirds of whom were engaged in agriculture. The chief crops grown are barley, rye, oats, flax and, in the southern districts, wheat. Formerly cereals were exported, but owing to the increase in the population the country now produces barely enough for home consumption.

Finland is richer in forests than any other European country except Northern Russia. Forests cover from 57 to 63 per cent of the total area. The large number of rivers and numerous waterfalls favour the lumber industry. The chief trees are *Pinus sylvestris* and *Picea excelsa*; beech and oak also cover extensive districts.

Finland is studded with lakes, rivers and swamps, and fishing forms a great source of revenue to the inhabitants. There is a considerable export of fresh fish.

Cattle raising is an important industry, and the country can export large quantities of butter. In 1914, 28,740,000 lbs. of butter and 5,416,000 lbs. of cheese were produced, 85 per cent of the butter being produced by the co-operative dairies.

413—**The Agricultural Possibilities of Morocco.**—MIEGE, EM., in *La Vie agricole et rurale*, Paris, March 1st, 1919. pp. 145-152.

The author gives an account of the geography, climate, population, agriculture and economic conditions of Morocco. The different crops grown in the country are then dealt with, as well as the foreign trade in agricultural products. The live stock situation is then discussed in detail.

In 1916 there were in Morocco, 62,950 camels, 140,545 horses and mules, 250,980 asses, 856,078 cattle, 30,000 pigs, 4,054,335 sheep, and 12,227,000 goats.

The author points out that the native methods of cattle raising are very primitive and imperfect. With proper methods the industry would have splendid possibilities.

CROPS AND CULTIVATION

422—**Studies on Capacities of Soils for Irrigation Water, and on a new Method of Determining Volume Weights of Soils.**—ISRAELSEN O. W., in *Journal of Agricultural Research*, Vol. XIII. No. 1, pp. 1-35. Washington 1918.

From 1910 to 1915 the author made a study of the economical duty of water for alfalfa in Sacramento Valley, California. Certain observations were made in connection with the experiments on the capacities of soils for irrigation water and on a new method of determining the volume weight of soils.

Capacities of Soils to Retain Irrigation Water.—The principal results obtained by the author were: Percentages of pore space which are filled by the water that a soil holds immediately after irrigation increase with the increase of the fineness of soil texture. Variations from 40 per cent in silt-loam soils having fine sandy-loam subsoils, 51 per cent in the silt-loams, 58 per cent in the clay loams, to 66 percent in the clay soils have been noted.

The ratio of the maximum capillary capacities of soils, as determined in a 10-inch tube in the laboratory, to that of the same soils observed in the field after irri-

gation varied from 1.78 ± 0.06 to 1.98 ± 0.14 .

Correlation between the moisture equivalent and the maximum amounts of water found after irrigation, show a gratifying agreement and suggest that the moisture equivalent might be made a basis of judging maximum capillary capacities.

A New Method of Determining the Volume Weights of Soils.—In order to ascertain accurately by means of moisture determinations the volume of irrigation water which a given volume of soil absorbs and retains, it is obviously necessary to know with a fair degree of accuracy the volume weight of the soil in place. The ordinary method of determining volume weight of samples of disturbed soil could not be relied on. The use of an iron cylinder to be driven into the soil for determining its volume weight in place was considered. It was concluded that this method was unsatisfactory because of the tendency of the soil below the cylinder to become compacted and thus be driven ahead of, instead of into, the cylinder.

For these reasons, the author devised the following new method. The soil samples, used for making moisture determinations were secured by the use of a 2-inch auger of the post-hole type. The diameter of the tip or cutting edge of the bowl of the auger used was slightly greater than that of the base in order that there should be no displacement of soil by lateral thrust or compacting ahead of the borer. Instead of measuring the volume of the sample thus obtained, the volume of the hole was measured by inserting a very thin-walled elastic rubber tube into the auger hole and filling it with water from a graduated cylinder. A special rubber tube having a diameter of $2\frac{1}{2}$ inches and a length of $6\frac{1}{2}$ feet was secured and determinations were made of the volume weight in the following way. Borings were made with a 2 inch auger to a depth of 1 foot, the soil being placed on an oilcloth and then into a suitable bag. The closed spherical end of the rubber was then forced into the hole upon the rounded end of a pole $1\frac{1}{2}$ inches in diameter. Water was poured from a graduate cylinder into the tube until it was filled flush with the surface of the soil. The water was then drawn out of the tube by means of a small pump, after which the tube was taken out of the hole and dried. Then the borings were continued to a depth of 2 feet and the volume of the hole again determined the volume of the section from 1 to 2 feet being obtained by difference. This process was continued until the six upper 1 foot sections had been studied. The soils were oven dried and weighed. The volume of the tube 200 centimeters, was taken into account in determining the total volume occupied by the undisturbed soil.

The results of this new method of determining the volume weight of clay loam soil,

as checked by a paraffin-immersion method first used by Prof. Chas. F. Shaw and by use of an iron tube, were subject to an error of less than 1 per cent.

The Influence of Farmyard Manure on the Clover Crop.—RUSSELL, E. J., *Director of the Rothamsted Experimental Station*, in *Journal of the Board of Agriculture*, May 1919, pp. 124-130. London, England.

It is well recognized that clover plays a unique part in a rotation by providing stores of nitrogen not only for itself but also for succeeding crops. Obviously, any treatment that increases the clover crops may be expected to react on the following cereal crop, and any improvement that may result would thus exert a twofold effect, giving not only more clover, but rendering possible a larger cereal crop.

One of the fields at Rothamsted was laid out in 1904 to test the residual value of a number of manures, including farmyard manure, shoddy, guano, rape cake, superphosphate, bone meal and basic slag. No regular rotation was adopted, but clover was avoided. This rather unusual course was followed because it was desired to avoid the complication that a clover crop would certainly have introduced. After the experiment had gone on for twelve years it was decided to make a change and to introduce clover: the twelfth crop had been mangolds. A crop of wheat was, therefore, taken as the thirteenth crop in 1915-16; this was seeded with clover, to which no manure was given.

The field is divided into eight strips, each of which receives a particular manure. The manure is not applied each year over the whole strip, however, but not only over part. The strip is divided into five plots, one of which is unmanured, while each of the other four receives a dressing of manure in turn, so that four years elapse before any particular plot receives a second dressing.

In consequence, some of the clover plots had received manure for the preceding wheat crop, others for the mangold crop grown two years before, others for the barley preceding the mangolds, others for the swedes preceding the barley, while others again, described as controls, had had no manure since 1904.

The whole field received 3 cwt. of sulphate of potash in 1906, and 2 cwt. in 1911.

The results are given in detail in a table in the article. They bring out the very interesting fact that none of the manures except farmyard manure has any marked effect in increasing the clover crop. Rape cake, guano and shoddy seem to have no effect at all, even when applied to the preceding wheat crop. Superphosphate, bone meal and basic slag may have had a small effect, but nothing very definite. Farmyard manure, on the other hand, has had a striking effect; the clover grown after manured wheat gave crops as follows:—

Manure Applied to preceding wheat crop.	Yield of Clover Cwt. per acre		
	1st Cut	2nd Cut	Total
No manure (mean of 8 plots)...	18.9	25.4	44.3
Farmyard manure (ordinary)...	38.2	27.4	65.6
" " (cake-fed)....	38.4	27.2	65.6
Shoddy.....	17.6	24.1	41.6
Guano.....	19.4	27.4	46.8
Rape cake.....	18.6	25.6	44.2
Superphosphate.....	18.1	23.8	41.9
Bone meal.....	14.7	29.0	43.7
Basic slag.....	24.3	24.6	48.9

There is, however, a further striking result. The effect of farmyard manure is not exhausted after a single season: dressings applied two, three, or even four years beforehand produced notable increases in crop.

The broad result of the experiment is that farmyard manure has caused increases in the clover crop, no matter when it was applied in the rotation, while the other fertilizers have not.

All the results are higher than usual at Rothamsted, doubtless one consequence of the long period, exceeding fourteen years, that had intervened since the preceding clover crop. This is no more than might have been expected, but it would hardly have been anticipated that farmyard manure would prove to be the only fertilizer that had left any residue of benefit to the clover.

The higher clover crop was followed by a higher wheat crop and there was a gain of no less than 8 bushels of wheat and $7\frac{1}{2}$ cwt. of straw in the plots which had carried a good clover crop as compared with those which had not.

The usual experience on the Rothamsted farm is that a dense wheat crop rather injures the clover, whilst a small wheat crop allows a fuller development.

An experiment closely resembling that at Rothamsted was made in Virginia in 1902 and 1909, and the results were similar. Various fertilizers were applied to the wheat crop in 1901; their effect on the succeeding clover crop was very marked:—

Manure applied to wheat crop in 1901.	Clover Hay (2 crops)	Repetition in 1909 Mixture of Timothy and Clover Hay
	Lb. per acre	Lb. per acre
No manure	2,850	505
Stable manure, 2 tons	9,550	7,800
Sodium nitrate, 40 lb.	7,250	4,700
Acid phosphate, 40 lb.		
Potassium sulphate, 15 lb.	2,000	2,125
Sodium nitrate, 40 lb.		
Potassium sulphate, 15 lb.	6,700	5,600
Sodium nitrate, 40 lb.		
Acid phosphate, 40 lb.	6,700	5,600
Potassium sulphate, 15 lb.		
Lime (100 lb. in 1900)		

Again, at the Ohio Experimental Station it was found that the clover responded better to farmyard manure than to any other fertilizer in a five-year rotation, as will be seen from the following table:—

Manure	Average Yield (6 crops) Lb. per acre
No manure, lime.....	2,383
" " floats.....	3,650
Farmyard manure, lime.....	3,945
" " floats.....	4,653
Complete fertilizer, lime.....	3,504
" " (low nitrogen), floats..	3,974
Complete fertilizer, lime ..	3,630
" " (high nitrogen), floats.	4,217

Against these results, which are in accordance with those obtained at Rothamsted, must be set one at Iowa, where in a rotation of maize, maize, oats, clover, the farmyard manure proved no more effective than phosphates and potassium salts. However, the manure was applied on the clover sod just before ploughing, so that only a fifth-year residue was available.

A Study of the Relation of some Morphological Characters to Lodging in Cereals.—

GARBER R. J., and OLSEN P. J., in *Journal of the American Society of Agronomy*, May 1919, pp. 173-186, Washington, D.C.

One of the perplexing problems which confronts the cereal plant breeder is the production of nonlodging small grains which at the same time possess high yielding capacity.

In 1916 a project was organized in the Minnesota Agricultural Experiment Station with the object of determining whether some simple morphological character is closely correlated with lodging or nonlodging.

The article, which gives complete details of the experiments and their results concludes as follows:

Extreme varieties for lodging in wheat, oats, and barley, were selected for this study, and measurements were also made of Minnesota No. 2 winter rye, which stands up better than the other cereals. A study was made of the correlation between lodging behaviour and average size of culm, average number of bundles, average area of sclerenchyma, thickness of culm wall, length of lignified cells, and thickness of lignified cell wall. None of the above-mentioned characters except thickness of cell wall seems closely related to lodging.

Both the early and medium oat strains examined showed a distinct correlation between thickness of lignified cell walls and lodging.

In general, lodging in cereals is dependent on so many factors of unequal value in the different sorts that no one factor seems to be correlated closely enough with lodging to be of much value as a selection index.

Among the different strains of oats and barley, average number of vascular bundles was found to be correlated with average diameter of culms.

452—Observations on some Wheats Sown in the Spring in France.—VILCOQ, A., in *Comptes rendus des Sciences de l'Académie d'Agriculture de France*. Paris, Feb. 19, 1919, pp. 223-227.

The author gives the results of his investigations on the spring wheats, Manitoba and Aurora, and on the varieties Little John and Victor.

The variety Little John is the result of a cross between the Hindoo wheat Glinka and the variety Square Head Master. It is rich in gluten and is very popular as a winter wheat in England. The variety Victor is a white wheat of very high yield.

The 4 wheats were sown at Chesnoy on March 26, 1918 in a well prepared sandy soil. Superphosphate was spread on the land before sowing and later, in April, nitrate of soda.

From the first month the author observed differences between the 4 wheats, which, according to rapidity of growth and vigour were classified in the following order: Aurora, Manitoba, Victor and Little John. The first two completed their growth normally and were harvested about August 12th, but the other two were not ripe until September 14th. Aurora yielded 22-2.3 bushels per acre and Manitoba 15-2.3 while Victor and Little John did not yield more than the amount used for seed. The summer was exceptionally dry.

The results show that Little John and Victor wheats can be considered only as winter wheats. Aurora proved to be superior to Manitoba for the region and was equal to some good winter wheats.

Kota, a Rust-Resisting Variety of Common Spring Wheat.—WALDRON, L. R., and CLARK J. A., in *Journal of the American Society of Agronomy*, May, 1919, pp. 187-195, Washington, D.C.

A variety of bearded hard red spring wheat designated as Kota (C.I. No. 5878) has been shown to possess resistance to the form or forms of the stem rust of wheat present at Fargo, N. Dak., Brookings, S. Dak., and St. Paul, Minn., in 1918. Additional evidence of such resistance was secured in 1917. This resistance is decidedly greater than that possessed by the common spring wheats and second only to the more resistant durum wheats.

Results secured at Fargo, N. Dak., in 1918 showed a capacity for yield decidedly above the average of the common wheats and only slightly less than the average yield of the durum wheats.

Milling tests conducted with Kota wheat showed it to produce somewhat less flour than the average of other wheats used in the same test. Baking tests ranked it very high as a

bread wheat, as it markedly exceeded the other common wheats except Marquis which it equalled.

Farm Practice in Growing Sugar Beets in Michigan and Iowa.—WASHBURN, R. S., MOORHOUSE L. A., SUMMERS T. H., and TOWNSEND C. D., in *United States Department of Agriculture Bulletin* No. 748, 45 pp. Washington, D.C. 1919.

460—"Pasto Salitrero" (Sporobolus phleoides) a Forage Plant for Alkaline Soils in Argentina.—DIAZ, C., in *Revista de la Sociedad Rural de Cordoba*, Year XVIII, No. 343, p. 1452, Cordoba, Argentina, July 1918

In Argentina there are thousands of square miles of alkaline lands very little in use. The author recommends the cultivation of *Sporobolus phleoides* on these lands. This Argentine grass which grows to over three feet in height grows exclusively on alkaline soils and is very resistant to drought. The chemical composition of air-dried *Sporobolus phleoides* is as follows: moisture 14.41 per cent, fats 2.80, crude protein 8.30, crude fibre 23.15, carbohydrates 30.17, soluble ash 4.06, insoluble ash 4.23, undetermined matter 12.88.

Analysis of the surface soil in which *Sporobolus* grows gave moisture (hygroscopic) 2.25 per cent, fine sand 62.50, clay 20.36, humus 1.25, lime 2.14, salts soluble in water 11.50. This forage plant is relished by cattle and horses.

The Effect of the Environment on the Loss of Weight and Germination of Seed Potatoes during Storage.—BUTLER, O., in *Journal of the American Society of Agronomy* March 1919, p. 114, Washington, D.C.

Potatoes generally lose from 10 to 16 per cent of their weight during storage and germinate long before they can be planted, thereby necessitating "sprouting", an operation which lowers the quality of the tubers for seed. The article summarized gives the results of a study of the factors constituting the environment of stored tubers, such as temperature, oxygen supply, and humidity of the air.

The temperature at which potatoes are stored has a marked effect on the rate of loss of weight. At a mean temperature of 48°F. the loss of stored potatoes becomes increasingly rapid with age, while at 38-7°F. the loss practically ceases after the 120th day. It is therefore clear that from the point of view of loss of weight, storage at a low temperature is highly desirable. It seems, however, that no material advantage would accrue from storing potatoes at a mean temperature lower than 38-7°F., since germination is sufficiently delayed for all practical purposes (210 days) when the tubers are stored at this temperature.

In the potato the loss of weight in keeping is in part due to respiration. Hence, a reduction in the available oxygen supply will

lower respiratory activity and retard metabolic changes. Experiments show that loss of weight can be materially curtailed by reducing the oxygen supply and that asphyxiation does not occur at 46.4°F to 50°F., even when as little as 0.8 per cent, of the volume of the air is renewed daily during 90 days. Germination can be prevented more effectively by reducing the oxygen supply than by lowering the temperature, as no signs of germination in reduced oxygen at a mean temperature of 48.7°F. occurred in 207 days, while at a mean temperature of 38.7°F. germination had already begun in 210 days.

Potatoes lose weight less rapidly, other things being equal, in moist than in dry air. Relative humidity is an even more potent factor in reducing the loss of weight during storage than temperature. Saturated air and dry air are both to be avoided, the former because transpiration is inordinately increased and the latter because condensation of water vapour occurs, forming a nidus favourable to the development of molds.

LIVE STOCK AND BREEDING

Breed and Size of Cows as Factors Affecting the Economy of Milk Production.

NEAENS W. B., in *Journal of Dairy Science*, March 1919, pp. 99-107. Baltimore.

The author concludes that large cows of any breed have the advantage over the smaller cows in not requiring so much feed for maintenance per pound of live weight. The maintenance requirement of cows is directly proportional to body surface and not to weight. Large cows eat and produce more than small cows, and are more efficient producers.

The article contains tables giving the records of cows entered in a Holstein, Jersey and Guernsey cow competition in Wisconsin. In that competition the Holsteins were the most efficient producers of milk and total solids. The Guerneys and Jerseys were about equally efficient as producers of butter-fat, and both breeds were slightly more efficient in this respect than the Holsteins.

Production of Goats in far Western Ranges.

CHAPLINE W. R., in *United States Department of Agriculture, Bulletin No. 749*, 35 pp. Washington, D.C., 1919.

The Utilization of Irrigated Field Crops for Hog Pasturing.

FARRELL, F. D., in *United States Department of Agriculture, Bulletin No. 752*, 37 pp. Washington, D.C. 1919.

An Experiment in the Rearing of Calves on Whey and Meals.

—*Journal of the Board of Agriculture*, April 1919, p. 39-50. London, England.

Owing to the lack of separated milk, the rearing of calves on the cheese-making farm presents greater difficulties than is the case

on the butter-making farm. The only by-product arising from cheese-making is the whey, which is commonly regarded as too deficient in nutritive matters, especially albuminoids, to serve as a satisfactory basis for calf-rearing, and is consequently given to pigs.

Arrangements were made by the Board of Agriculture for comprehensive investigations into the value of whey as a feed for calves, the results of which experiments are given below. In deciding upon the supplementary foods to be fed along with whey, consideration was given primarily to the differences in composition between whole milk and whey. In devising rations the aim kept in view was to obtain a mixture such that 1 lb. added to 1 gallon of whey would give a food approximately equal in nutritive value to that of 1 gallon of whole milk.

According to the investigators the results of the experiments justify the laying down of the following practical directions for those who wish to rear calves on whey and meal.

Any of the following meal mixtures may be selected for use: (1) Linseed meal, 3 parts, linseed-cake meal, 2 parts; (2) Linseed meal, 3 parts, bean meal, 3 parts, fish meal, 1 part; (a) Linseed meal, 2 parts, fish meal, 1 part; (b) Linseed meal, 1 part, cocoanut meal, 1 part; (c) Bean meal, 5 parts, linseed-cake meal, 4 parts; (d) Linseed meal, 3 parts, fish meal, 1 part, ground oats, 3 parts.

Of the above mixtures the experiment indicated that a slight preference is to be attached to the bean meal mixtures (2 and c).

(2) The meal mixture should be used at the rate of 1 lb. to each gallon of whey, which should be warmed to blood heat.

(3) Half an ounce of precipitated bone phosphate should be added to each gallon of whey.

(4) From the age of four weeks the calves should be given hay *ad lib.*, and, as soon as they will eat it, linseed cake or a mixture of linseed cake, cocoanut cake and gluten feed, starting with 2 oz., and rising eventually to 8 oz. per head.

(5) The system of feeding should be as follows:—

(a) Birth to 2 weeks—Colostrum followed by new milk.

(b) 2 weeks to 4 weeks—At two weeks commence substituting whey and meals (prepared as directed under 2 and 3 above) for milk. Daily increase the amount of the substitute and decrease the milk given until at the age of four weeks the calf is getting 1 gallon of whey, 1 lb. of meal, and no milk. At the outset the meal should be mixed with whey, but as soon as the calves will eat it in the dry form, they should be allowed to do so and the warmed whey containing the precipitated bone phosphate given as a plain drink.

- (c) 4 to 5 weeks—Continue to feed 1 gallon of whey and 1 lb. of the meal daily and allow, in addition, from this time forward, as much hay as the calf will eat.
 - (d) 6 to 7 weeks—Increase above ration by starting to feed linseed cake or a mixture of linseed cake, coconut cake, maize gluten feed at the rate of 2 oz. per day, given after morning feed, gradually increasing the amount up to 6 oz. per head per day.
 - (e) 8 to 9 weeks—Increase the daily feed of whey to 1½ gallons, and the weight of the meal mixture to 1½ lb.
 - (f) 10 to 12 weeks—During this period the calves remain on full ration.
 - (g) 13 to 14 weeks—Reduce the meal mixture gradually from 1½ to 1 lb. per day, while maintaining the full supply of other foods.
 - (h) 15 to 16 weeks—Reduce the whey to 1 gal. and the meal mixture to ½ lb. per day. The calves now get—1 gal. whey, ½ lb. meal mixture, 6 oz. cake (or cake mixture), hay, *ad lib*.
 - (i) 17 weeks—If the calves can be put out to grass, or if a supply of succulent farm foods is available, the whey and meal mixture may be discontinued at the end of 17 weeks, but in this case the quantity of the cake allowed should be increased to ½ lb. per head per day.
- (6) Should any digestive trouble in the form of "blowing" occur in the calves during the early stages of feeding whey, it can be successfully dealt with by adding a little precipitated chalk to the whey.

Feeding Horses.—BELL G. A. and WILLIAMS, J. O., in *United States Department of Agriculture, Farmers' Bulletin* No. 1030, 24 pp. Washington, D.C. 1916.

FARM ENGINEERING

1404—Equipment for the Commercial Evaporation and Drying of Fruit in the U.S.A.—BEATTIE J. F. and GOULD H. P., in the *U.S. Dept. of Agriculture, Farmers' Bulletin* No. 903, 60 pp., 22 Figs. Bibliography of 20 publications. Washington, September, 1918.

Although intended for those who contemplate engaging in the art of drying or evaporating fruits or vegetables, this bulletin contains very useful information for all who wish to dry fruits for home use. The authors describe the various types of equipment for drying fruits or vegetables, as well as the methods of heating that are most used and which have given the best results taking their simplicity and economy into account.

The driers used in the apple-drying industry of the eastern portion of the United States are for the most part of the kiln type. The almost universal use of this type is due to the low first cost of the kilns and the small amount of labour required to operate them.

In an area of Western New York there are some 2,000 commercial driers, 500 being large plants; about 75% of the evaporated apples produced in the eastern portion of the United States come from this area. Other States, such as Virginia, Illinois, Arkansas and Missouri, also produce considerable quantities of evaporated apples, most of which are prepared in kiln driers.

The modern kiln consists of a structure two stories high, the ground floor being occupied by the furnace while the second floor serves as the drying room. The construction of the building, the air ducts, the drying floor, the drying plant, are all described in detail, plans and figures being also given.

The steam-heated cabinet drier has been found to be a more efficient type as well as being adapted for use in any locality. There are 6 rows of steam pipes spaced so as to admit two trays between every two rows of pipes. The description of this drier is accompanied by figures showing the construction and working details.

Tunnel driers require more labour, and for this as well as other reasons they have never come into general use in the apple-drying districts of the eastern portion of the United States. They are suited for drying cherries, maize or other material best handled by spreading on trays.

The bulletin describes the preparation of fruit for evaporation, the evaporation of the fruit, the time required for drying, etc. and gives practical directions for drying peaches, pears, cherries, prunes, etc. The sun drying of fruits, the preparation of evaporated and dried fruits for market, are dealt with and the laws relating to evaporated and dried fruits in force in the United States are considered.

Care and Repair of Farm Implements.—JOHNSON, ELMER, in *United States Department of Agriculture, Farmers' Bulletin* 1036, 20pp. Washington, D.C. 1916.

Motor Transportation for Rural Districts.—COLLINS J. H., in *United States Department of Agriculture, Bulletin* No. 770, pp. 32 Washington, D.C. 1919.

RURAL ECONOMICS

510—Validity of the Survey Method of Research.—SPILLMAN, W. J., in *U.S. Department of Agriculture, Bulletin* No. 529, 15 pp. Washington, April 1917.

Knowledge of the details of farm practice and of results arising from this practice may be obtained in two ways. First, careful records may be kept of the details of the farm work and the business transactions of the farmer. Second, such details may be obtained by interviewing farmers who give them accurately as may be from memory, or from such desultory records as may have been made of the farm operations. The first of these methods involves years of labour and

enormous expense, the second gives an enormous amount of data in a short while and at a nominal expense. The question is as to the relative accuracy of the two methods.

Studies of these methods lead to the conclusion that errors in the farmers' knowledge of the details of his business and of the work he does are in every way comparable to the departures from the true mean in field plot experimental work and that they distribute themselves about the true values in approximately the same manner. The fact that the survey method of investigation gives data sufficient to permit the law of averages to eliminate plus errors by the occurrence of similar minus errors while plot experiments ordinarily do not do this appears to justify the statement that the survey method is a more reliable means of arriving at those facts to which it is applicable than the field plot experimental method. It appears, in fact, to occupy a place intermediate between plot experiments on the one hand, where variations in other factors than that under observation occur and are not adequately eliminated, and laboratory studies on the other hand, in which variations in other factors are largely prevented. These variations due to factors other than that studied do occur in using the survey method, but the amount of data obtained by this method is sufficient to permit the elimination of such variations by the operation of the law of averages. The fact that there is such unanimity in the conclusions of the investigators using the survey method in all parts of the country is, of itself, evidence of the general validity and great utility of this method of research.

AGRICULTURAL INDUSTRIES

523—Killing Hogs and Curing Pork on the Farm.—ASHBROOK, F. G., and ANTHONY, G. A., in *United States Department of Agriculture, Farmers' Bulletin* 913, 39 pp. Washington, Dec., 1917.

This bulletin advises farmers to grow and cure their own pork on the farm. The cheapest meat the farmer can use is the product of his own farm. Home-cured pork of the right kind always has a ready market, and in many cases it will prove the best way to market hogs. This bulletin explains how to slaughter hogs and cure pork. Butchering and cutting up the carcass, lard rendering, brine and dry curing, smoking and sausage making are all discussed. Details and plans for building a small ice-house are given.

Commercial Preservation of Eggs by Cold Storage.—JENKINS, M. K., in *United States Department of Agriculture, Bulletin* No. 775, 35pp. Washington, D.C., 1919.

A Simple Method of Making Silage.—OLDERSHAW, A. W., B.Sc., in *Journal of the Board of Agriculture*, London, England, July, 1919 pp. 450-451.

Describes a method of making silage in Norwich County, England. In place of a silo a pit about 4 ft. deep, 25 yards long and

5 yards wide is used. The sides have a slight slope, which prevents access of air and allows for shrinkage of the silage. The pit, when quite full, holds the produce of 50 acres of lucerne, or sufficient to keep 100 cows for 6 months.

After the lucerne has been cut it is carted to the pit without chaffing. To avoid any strong smell from the finished product the crop should lie a day or two before carting—this must, however, depend on the weather. If the crop is carted very green the smell is apt to be offensive, hence it is better to allow the crop to wilt. Five or six acres of lucerne are carted in a day. Carting is carried on for 2 days, the work then being left for 1 day and again proceeded with for a further 2 days. As regards the labour required, 2 men are wanted at the heap, 3 men to put the crop into rows in the field, 2 men to pitch and 1 man to load.

When the pit is being filled, the first few loads are tipped in at each end, to enable the horses to draw the succeeding loads towards the centre, as one would draw over a heap of farmyard manure. When the lucerne in the pit is level with the surrounding ground the loaded carts go over it, and as it gets higher horses walk about on it. Carting continues until the heap stands about 12 ft. above the level of the ground, or as high as it can be made without rendering it impossible for the horses to draw up the loads. The sides and ends are then roughly cut and squared and the whole is topped up and roofed with earth by hand like a mangold clamp. The pre-war cost of filling worked out at about \$1.70 per acre.

On the farm where the method is used for silage has been made in this way for about 30 years. Only once has the method been a failure, due to carting the crop when it was too wet.

The cost of excavation is not great on sandy soil and no special drainage system is needed. If such a silo were made on heavy land, however, the site would have to be carefully chosen so that good drainage could be provided to take away all surface and underground water. Probably the silo might be made near a deep ditch and pipe drains arranged to take away the water. It is possible, though not certain, that it might be an improvement to put a layer of concrete on the sides and floor of the trench.

The silage made by this trench method has been found of excellent quality. The following shows the results of analyses of silage made in this way:

	Lucerne Per cent	Trifolium Per cent
Moisture.....	49.00	65.88
Oil.....	0.82	0.94
Albuminoids.....	8.62	4.69
Carbohydrates.....	18.74	13.36
Fibre.....	19.09	11.89
Ash.....	3.73	3.24
	100.00	100.00

The City Home Garden.—BEATTIE, W. R., in *United States Department of Agriculture, Farmers' Bulletin* 1044, 39 pp., Washington, D.C., 1919.

PLANT DISEASES

Eradication of Weeds by Sprays and Manures.—BRECHLEY, WINIFRED E., D.Sc. of the Rothamsted Experiment Station, in *Journal of the Board of Agriculture*, March 1919, p. 1474-1482. London, England.

Many attempts have been made to supplement the mechanical means of eradication of weeds by more rapid chemical methods. The chief reason that chemical weed killers can work successfully when applied to growing crop lies in the fundamental difference in the habits of the majority of weeds and of such crops as cereals. The leaves of many weeds are broad and outstanding, and are often wrinkled, so that if moisture falls on them it is retained for a considerable time, often till it is dried up by evaporation. Cereals, on the contrary, have long, narrow, smooth leaves which grow upright and are often covered with a waxy coating or "bloom", so that the leaves do not remain wet for any length of time, as moisture cannot adhere to them. If, therefore, corrosive or poisonous substances are sprayed on to the plant, the cereals throw them off and are not injured, whereas the weeds retain them and suffer the full extent of the possible injury. This same characteristic, however, renders it impossible to treat with chemicals such broad-leaved crops as clover, trefoil, sainfoin, and serradella, as their leaves retain the injurious substance in the same way as weed leaves. With root crops, the constant cultivation that is carried on, is usually sufficient to keep weeds in check, so that on arable land, as a rule, it is only cereals that are dealt with by chemical means, though copper sulphate has been used to eradicate charlock from mangolds without injury to the crop.

These methods are not so useful on grass land, because, as the herbage consists of a mat of plants with a large total leaf surface, the chemicals are held up even by the grasses, and the amount of spray necessary to kill the weeds is sufficient to cause serious injury to the herbage itself, especially to such broad-leaved plants as clovers, which are a valuable constituent of the crop. In the majority of cases it is not possible to apply the spray in such a way that it reaches the weeds without affecting the rest of the herbage, and in consequence the method is of but limited use on grass land.

The success of the chemical eradication of weeds depends to some extent upon the weather. It is essential that the substance employed should remain upon the leaves long enough to come into action, and therefore, if heavy rain falls immediately after an application of liquid spray, much of the benefit is lost. Consequently it is sometimes

necessary to repeat the operation if the weather breaks too soon after a dressing of the destructive agent. Dry substances would easily be blown off from dry leaves, so when these are used it is usual to carry out the work when the leaves are wet with dew or rain, as then the stuff adheres firmly when the leaves dry.

The chemical substances used as weed killers may be divided into two groups:—

1. Chemicals that merely destroy the weeds and have no direct beneficial action upon the growth of the crops. These substances are usually applied in the liquid form as *sprays*.
2. Compounds that not only destroy the weeds but also exercise a manurial action, thus directly benefiting the crop at a later date. These substances are usually very finely ground *manures* and are applied as dry powders when the leaves are damp.

(1) **SPRAYS.**—Most of these are corrosive in nature and destroy the delicate plant tissues, either killing the weeds outright or so crippling them that they cease to be active competitors of the crop. The chemicals are applied in solution, the strength varying according to circumstances. The most commonly used sprays are copper sulphate, iron sulphate, and sulphuric acid, but other substances are occasionally employed. A summary of many of the earlier spraying experiments was drawn up by H. C. Long in 1910, and the results of these have largely been confirmed by those set forth in the present paper.

Copper Sulphate.—Copper sulphate in solution is the most familiar of the weed sprays used on a farm, and is generally associated with the destruction of charlock (*Brassica Sinapis*), though it is effective with other weeds. The rough crinkled leaf of charlock renders it very susceptible to injury and, given suitable weather, spraying nearly always makes a considerable reduction. The spray is best applied when the leaves have three or four well developed leaves, though later applications are often effective. The writer saw a farm at Gedling, Notts, in which charlock had been successfully sprayed when in full flower, but this delay is not to be recommended. Various experiments have shown that a 4 or 5 per cent solution (4 or 5 lb. copper sulphate in 10 gal. of water) is the most effective strength, about 40 to 50 gal. containing 16 to 20 lb. copper sulphate per acre being required. In all cases the quantity of liquid should be sufficient to wet the weed thoroughly. In some cases a 3 per cent solution is strong enough, but only under specially favourable conditions.

Copper sulphate will eradicate spurrey if it be used strong enough. 50 gal. per acre of a 5 per cent solution is effective, but a 3 per cent solution only destroys about half the crop, allowing the other half to recover and ripen its seeds. In the latter case the shoots at first become brown and shrivel at

the tips, so that growth is checked for a time, but later on recovery sets in with many plants. Poppies are far more sensitive than spurrey as even a 2 per cent solution injures them, and it has been suggested that two applications of a 3 per cent solution with an interval of a few days might prove very effective in destroying them.

If a soluble manure is added to a corrosive spray the action of the latter is sometimes accentuated, as the manure stimulates the crop and enables it to forge ahead before any weeds have a chance of recovering from the action of the spray. Corn buttercup (*Ranunculus arvensis*) is very resistant to the action of copper sulphate, as a 4½ per cent solution has but little effect on it. In one case, however, a clearance was effected by applying a 9.9 per cent solution of copper sulphate, with the addition of 22 lb. sodium nitrate to each 10 gal. About 35-40 per cent of the weeds were killed or badly injured, and before the rest could recover and make much growth, the wheat had benefited and grown right away from the weeds. Such strong applications of copper sulphate, however, are not to be advised as a rule, as they need very careful handling to avoid doing damage to the crops.

Iron Sulphate.—To a great extent this can be used as a substitute for copper sulphate, but stronger solutions of the iron salt are necessary to obtain equal results. On the Continent iron sulphate is largely used for the destruction of charlock, 40 gal. per acre of 7 per cent solution being most effective, especially among oat crops. In German experiments much heavier dressings have been used satisfactorily, and when 53 gal. per acre of a 22 per cent solution were applied to infested oats not only was charlock destroyed, but the yield of oats from the treated plot was reported to be six times as heavy as that from a similar plot left untreated. In this case care was taken that the plants were quite dry before treatment, and the drastic effects on the charlock were visible within two days. In this country the best results have been obtained with a 15 per cent solution, that is to say, 60 lb. of iron sulphate dissolved in 40 gal. of water, per acre. The addition of molasses to the spray is sometimes recommended, as it causes the compound to adhere more firmly to the weeds.

Iron sulphate is better than copper sulphate for eradicating poppies and corn buttercup. A 15 per cent solution destroys the weeds and does not injure the cereal crop: for corn buttercup spraying should be done in February, and for poppies as soon as the seedlings have developed three or four leaves.

Although this spray, cannot be used on broad-leaved crops growing alone, it may be safely applied when leguminous crops are associated with cereals, as the latter are the taller and, together with the larger weeds, receive the bulk of the spray, thus protecting the lower growing broad-leaved plants to a great extent.

Sulphate of iron may also be applied dry as a fine powder at the rate of 3 to 4 cwt. per acre and should be broadcasted or scattered by machine in the early morning while the leaves are still wet with dew.

Sulphuric Acid.—This is the most potent substance utilized for weed destruction, and owing to its corrosive nature needs very special precautions in handling. If properly dealt with, however, it proves effective in cases in which the more usual sprays are of little value. Sulphuric acid is one of the few sprays that has been found to clear grass land of bracken. A 5 per cent solution causes the leaves to wilt within a few hours, and some days later the stems turn black and wither, because the acid is gradually conducted along the midrib and down the stalk, eventually, reaching almost to the underground rhizomes. A new growth springs up later, but a second spraying disposes of this for the year and also weakens the plant for the future. When the growth of bracken is dense, the canopy formed by the bracken leaves protects the underlying herbage from the harmful effect of the acid, and as the following year the fern is later in appearing the grasses are able to get ahead earlier, resulting in an improved pasture.

On the Continent, sulphuric acid is considered a safe spray for cereals if used when the crop has only about five or six leaves. It is much used in parts of France (Lot-et-Garonne) for destroying wild radish among wheat, 90-100 gal. per acre of an 8 or 10 per cent solution being employed. It is somewhat selective in its action, as certain weeds escape, especially wild oat (*Avena fatua*), medicks (*Medicago sp.*) and members of the lily family (as wild onion). It is, however, deadly to most annual and biennial weeds as poppies, charlock, corn buttercup, cornflower, wild carrot, radish, vetches and vetchlings, and it is said to be very effective in clearing these pests from badly infested fields. For general use 60-70 gal. per acre of a 10 per cent solution is sufficient for oats, rather less being used for barley.

Various Other Sprays.—In view of the difficulty in obtaining large quantities of copper sulphate at the present time, preliminary experiments have been made to ascertain whether *nickel sulphate* can be used as a substitute. At Rothamsted charlock plants were sprayed with 3 per cent solutions of nickel and copper sulphate to contrast the effects. The nickel sulphate proved to be the slower in acting, but six days after spraying young plants were dead with both sprays, while with a 6 per cent solution the action was rather more rapid. At a later date some very large plants just coming into flower were sprayed, but though both substances burned the leaves rather badly, neither killed the plants. Probably stronger solutions would have been necessary at this stage, but this initial test indicates that

nickel sulphate may prove to be an effective substitute for copper sulphate.

Arsenite of soda, potassium chloride and sodium bisulphate have all been used as weed killers, but each has some special disadvantage which prevents it from coming into common use. *Arsenite of soda* is exceedingly poisonous to man and beast, and there is a great risk of poisoning when the crops are used, especially if it be applied to grass land which is either fed off or cut for hay. Besides this it is strongly held by the soil, being retained for an indefinite period in the top few inches, and if several successive applications are made, enough arsenite of soda may accumulate to hinder the germination and growth of crops sown on arable land and to exercise a harmful action on the herbage of grass land.

Potassium chloride is ruled out at the present time on the score of expense, but when prices were moderate a 20-30 per cent. solution was occasionally used for destroying charlock, as the solution shrivelled the plants up completely. The potash salt has no bad effect on the cereals, but rather works beneficially by acting as a manure in addition to destroying the weeds.

Sodium bisulphate resembles sulphuric acid in its action, and is readily and cheaply obtained in places. In parts of France, farmers can get truck loads from the powder works at the rate of 20 cents per 220 lb. free on rail. Eighty gallons per acre of 45 per cent solution are recommended for use, but the stuff is most unpleasant to handle though it needs less precaution than sulphuric acid.

To sum up, therefore, copper sulphate and iron sulphate are effective and simple sprays whose value has been proved by years of constant usage. Nickel sulphate, though practically unknown in this respect, offers possibilities and might repay more extended trial. Under special circumstances, sulphuric acid has much to recommend it, but the majority of other sprays are of less general value, though several of them meet the case under particular local conditions.

(2) MANURES.—The method of improving grass land by judicious artificial manuring has been gaining much ground of recent years. Incidentally this secures the reduction of the less useful plants or weeds, but this reduction is chiefly brought about by the increase in the competition of the more valuable grasses and not by a direct poisonous action on the weeds.

During the last few years, however, attempts have been made to destroy weeds on arable land by the application of finely ground manures, especially cyanamide and kainit, and on grass land by the use of lime, gaslime and salt, and a fair measure of success is considered to have rewarded the effort.

Calcium Cyanamide (Lime nitrogen).—Since this was introduced as a commercial manure

it has been used a good deal in Germany as a means of destroying charlock and wild radish on arable land. It is claimed that dressings of 90-135 lb. per acre are quite effective for this purpose, provided that the cyanamide is applied when the plants are small and the leaves are damp; thistles and poppies are injured as well as the charlock. In some cases the crops turn rather yellow for a few days after application, but they rapidly recover and make use of the extra nitrogen supplied, giving increased yields. When, however, these experiments were repeated in North Wales failure resulted, as a dressing of 80 and 120 lb. per acre had no permanent effect either on the charlock or the crop, and all the weeds recovered from the temporary check they received.

Kainit.—Kainit, applied to arable land at the minimum rate of 10-11 cwt. per acre, is said to be effective in destroying charlock and many other weeds. It needs to be very finely ground and should be dusted on the plants when they are wet with dew, or rain if possible on the morning of a fine day. For autumn-sown cereals, February or March is the best time of application, for spring-sown cereals the manure should be spread soon after the seeds have germinated and put out a few leaves. As kainit tends to consolidate the soil, a dressing of lime is advised on very heavy land to prevent this as far as possible.

Weeds vary in their response to kainit, as some are easily destroyed, whereas others are only slightly injured or escape damage. The chief weeds have been classified as follows:—

Weeds, badly injured or destroyed by Kainit. Charlock, wild radish, black bindweed, speedwell, chickweed, nettle, groundsel, cornflower, mayweed.

Weeds moderately injured.—*Persicaria*, spurrey.

Weeds only slightly injured.—*Sowthistle*, fumitory, poppy, spreading orache.

Salt.—Salt is occasionally useful in reducing weeds, especially on grass land. Five to six cwt. per acre applied in the spring at the time nettles are cut down, will do much to prevent this weed from springing up again strongly. A similar dressing in early April will also reduce oxeye daisy.

Thistles, however, do not seem to respond to treatment, as the effect of judicious cutting is not intensified by the application of salt.

Lime.—This differs in its action from the foregoing, as instead of directly destroying the weeds it makes the soil less suitable for certain of the worst pests on sown land, as spurrey, sheep sorrel, corn marigold and annual knawel. Spurrey is chiefly associated with light soils that are deficient in lime, and sheep sorrel, though it is found on both light and heavy soil, also indicates lime deficiency. Liming has been tried for the eradication of both these weeds, with indifferent success in the case of spurrey, with

rather more success with sheep sorrel. When these weeds are abundant the shortage of lime is usually very marked, and an impossibly heavy dressing would be needed to alter the balance so as to make the soil really unsuitable for weeds. An ordinary dressing, such as 1 or 2 tons of lime per acre, has no effect on spurrey, though it brings about some improvement in the soil itself, and may thus tend to suppress the weed by encouraging the competition of other plants. This is particularly the case on grass land, on which sorrel (*Rumex Acetosella*) and sheep sorrel (*Rumex Acetosella*) are usually much reduced when liming is resorted to. It is usual to apply about 30 cwt. per acre to light land ranging up to 3 tons per acre on heavy, wet soils.

Gas lime, at the rate of 20 tons per acre, has proved effective in destroying false brome or tor-grass (*Brachypodium sylvaticum*) on Down pastures. The gas-lime was applied in autumn, and soon killed the tor-grass (and other grasses as well). The following spring the land was harrowed and worked up to a fine tilth preparatory to sowing a mixture of good grass seeds for the provision of a strong new turf. Such a method could only be applied when the area affected is small.

Taking all things into consideration, the use of finely ground manures as weed killers offers possibilities, but up to the present, the results have been so uncertain and variable that it is not yet advisable to make definite recommendations for their use. Experimental work in this direction could easily be extended, as even though failure should attend the effort to destroy the weeds, the beneficial effect of the manure on the growth of the crop would offer considerable compensation.

Value of Molasses and Syrups in Poisoned Baits for Grasshoppers and Cutworms.—

MORRILL A. W., in *Journal of Economic Entomology*, August 1919, pp. 337-343. Concord, N.H.

Experiments were conducted on a large scale by the author in Arizona in 1918. The results of the experiments led the author to the following conclusions:

At the present time it may be considered as established that molasses or syrup of any kind is absolutely unnecessary as an ingredient of poisoned baits against many of the common cutworms. On the other hand some investigators have found that the addition of molasses increases the attractiveness of the bait to some species under certain conditions. Evidence is accumulating to the effect that against some species of grasshoppers the use of molasses or syrup is an unnecessary expense. Owing to the differences reported from different sections it would not be safe to assume that the same ingredients will be found equally attractive to the same species of grass-hoppers in different localities. Nevertheless it would seem logical to accept the results of experiments with any one species in any locality until such time as similarly conclusive experiments in other localities have proven a variability in results. Whenever molasses or syrup can be omitted there is not only a material saving in the cost of the bait but the simplification of the directions for its preparation leads to the more ready adoption of control measures by the farmers. While the value of the several ingredients in baits for use against grasshoppers is still a matter for investigation it seems most logical for entomologists to recommend the simple bran and Paris green or bran-Paris green and water mixture against cutworms except when there is some definite reason for the addition of molasses, syrups or other ingredients.

Value of Crude Arsenious Oxide in Poison Bait for Cutworms and Grasshoppers.—

DAVIS JOHN J., in *Journal of Economic Entomology*, April 1919, pp. 200-205, Concord, N.H.

From work conducted in various parts of the continent the author concludes that crude arsenious oxide is a satisfactory and reliable substitute for Paris green at about one-seventh the cost but that a powdered grade only should be recommended. The one advantage of Paris green over powdered arsenious oxide is its colour which simplifies the mixing and makes possible an unquestionable thorough mixture.

AGRICULTURAL ECONOMICS

PROPAGANDA CAMPAIGN BY THE AGRICULTURAL ORGANIZATION SOCIETY IN ENGLAND AND WALES

The Governors of the Agricultural Organization Society have decided to undertake forthwith an active and systematic campaign throughout England and Wales for the following purposes:

(a) To explain to the agricultural community the advantages of combination and co-operation on the part of the farmer.

(b) To strengthen existing Farmers' Co-operative Societies and to aid the establishment of new societies.

(c) To secure the adhesion of 150,000 additional farmers to the movement.

The Agricultural Organization Society consider the transition from war to peace conditions, with all the difficulties that agriculture will have to face in future offer a splendid opportunity to impress upon farmers the great lessons of co-operation in agriculture for business purposes on business lines.

At the present time over 50,000 English and Welsh farmers are members of co-operative farmers' societies, and hundreds are joining every day. To those farmers who are not members of a co-operative society it becomes a serious problem how they are to face the future under a system which often compels them to buy their requirements—the raw materials of their industry—at retail prices and sell their produce at wholesale prices in markets over which, without organization on co-operative lines, they can exercise no control.

Co-operation will go a long way to solve these difficulties, and the best agricultural opinion is that the farming industry—the

greatest industry in the land—must be reorganized and put on a better business footing in the same way as the manufacturing industries of the country.

The leaders of the campaign, the Earl of Selborne, K.C., Mr. Leslie Scott, K.C., M.P., and Major E. A. Belcher, C.B.E., the Society's new director of Propaganda, with their supporters, will tell the farmers at meetings, which are being arranged in succession for every market town in the country, how the objects of the Society can be achieved and what results have already been obtained by the numerous successful societies that have been promoted and fostered by the Agricultural Organization Society.

AGRICULTURAL STATISTICS

THE CEREAL CROPS OF 1919

The following table contains official estimates of the production of wheat, barley

and oats in 1919 compared with 1918 and the average of the previous five years:

Countries	1919	1918	Five years' average 1913-1917
	Bushels	Bushels	Bushels
WHEAT—			
Spain....	138,398,000	135,710,000	132,560,000
Italy....	154,324,000	183,296,000	173,809,000
Canada....	199,240,000	189,075,000	256,612,000
United States....	923,000,000	917,100,000	790,634,000
India....	276,526,000	379,829,000	352,315,000
Japan....	29,762,000	25,593,000	26,623,000
Tunis....	6,614,000	8,451,000	6,291,000
Totals....	1,727,864,000	1,839,054,000	1,738,844,000
BARLEY—			
Scotland....	5,971,000	5,633,000	6,252,000
Italy....	7,808,000	9,686,000	9,253,000
Canada....	65,584,000	77,287,000	47,273,000
United States....	195,000,000	258,000,000	199,212,000
Japan....	91,400,000	77,864,000	96,332,000
Algeria....	31,691,000		36,136,000
Tunis....	5,512,000	9,186,000	7,203,000
Totals less Algeria....	402,966,000	437,656,000	365,525,000
OATS—			
Scotland....	44,092,000	58,790,000	44,000,000
Italy....	29,179,000	42,685,000	30,328,000
Canada....	381,359,000	426,313,000	399,184,000
United States....	1,225,000,000	1,538,000,000	1,331,287,000
Japan....	9,078,000	6,258,000	5,552,000
Totals....	1,688,708,000	2,072,046,000	1,810,351,000

BROOMHALL'S FOREIGN CROP CABLE, SEPT. 10TH

United Kingdom.—The recent improvement in weather is maintained, with the result that the harvest is progressing favourably. Results of wheat can be considered disappointing, but coarse grains are up to expectations.

Russia.—According to latest cable advices the British Consul confirms previous statements referring to the good crops of cereals. The province of Khorson, which feeds Odessa,

is claimed to have good crops, and other indirect evidence of a surplus in the Ukraine is contained in reports that it is hoped Poland, which is said to be short of supplies, will endeavour to make up the deficiency by her purchases in the Ukraine.

Roumania.—Further good reports have been received of the outturn of wheat, and there is now no doubt that a fair surplus will be available for exportation if needed.

Alternate rains and hot weather have been very favourable for the growth of the corn crop and the outturn is expected to yield a surplus of some 20,000,000 bushels. We learn that feed has been rushed up the Danube to Budapest, which gives us the idea that Roumania and Bulgaria have probably furnished some of the needed supplies.

India.—Continued normal rains are very favourable, putting the soil in good condition for the new wheat seedings. Prospects for new seedings can be described as excellent. Good news of the agricultural situation continues to be received, and although crops now standing consist chiefly of millets, other native feed grain and corn, yet these are of the utmost importance in supplying home requirements and their

scarcity or abundance always has a strong influence in determining the quantity of wheat which may be available for export.

Holland and Belgium.—Advices tend to confirm fair crops in these countries.

Spain.—It is reiterated that the harvest of wheat was under expectations.

France.—Threshing has been active in this country and this operation tends to confirm the light crops previously predicted, especially of wheat. It can be said, however, the yields of barley and oats are better than anticipated. The quality of the new wheat is regarded as very good.

North Africa.—The yields of both wheat and barley in this grower are said to be short. The surplus of wheat this year will be light and barley is also a small crop.

UNITED STATES SEPTEMBER CROP REPORT

The estimated yields of the principal crops of the United States on September 1 as reported by the Department of Agriculture, Washington, compared with one year ago are as follows:—

	1919 Bushels	1918 Bushels
Winter Wheat.	715,000,000	558,000,000
Spring wheat	208,000,000	359,000,000

All Wheat	923,000,000	917,000,000
Corn	2,858,000,000	2,583,000,000
Oats	1,225,000,000	1,538,000,000
Rye	84,600,000	89,000,000
Barley	195,000,000	258,000,000
Flaxseed	10,200,000	14,657,000

	Tons	Tons
All Hay	102,000,000	89,833,000

IMPORTS AND SUPPLIES OF AGRICULTURAL PRODUCE OF THE UNITED KINGDOM DURING THE WAR

(From the Journal of the Board of Agriculture, March, 1919).

The total value of the principal articles of agricultural produce imported into the United Kingdom during the last five years is as follows:—

1918	\$2,061,500,000
1917	1,703,700,000
1916	1,457,200,000
1915	1,319,600,000
1914	1,030,400,000

These figures represent the value (cost, insurance and freight) as declared to the customs officers at the port of arrival, of the

grain and flour, meat and animals for food, butter, cheese, eggs, condensed milk, fruit and vegetables, hops, lard and margarine, which may be grouped together as agricultural products in the sense that they compete more or less directly with the products of the farmers of the United Kingdom.

No live cattle, sheep, or pigs for food have been imported since 1915. The following are the figures of the *home live stock* of the United Kingdom for the last four years, taken from the Board of Agriculture returns:

	1918	1917	1916	1915
Cows and heifers in milk or in calf. . .	4,087,762	4,014,132	4,034,382	4,068,957
Heifers in calf.	516,079	500,671	464,939	425,793
Other cattle:—				
Two years and above....	2,289,684	2,338,407	2,344,667	2,221,218
One year and under two....	2,747,295	2,757,222	2,801,698	2,665,551
Under one year....	2,670,329	2,771,804	2,805,854	2,789,933
Total of cattle....	12,311,149	12,382,236	12,451,540	12,171,452
Ewes for breeding....	10,985,361	11,444,673	11,603,904	11,341,904
Other sheep:—				
One year and above	4,905,964	5,527,120	5,576,513	5,397,745
Under one year....	11,171,356	10,895,451	11,669,238	11,536,321
Total of sheep....	27,062,681	27,867,244	28,849,655	28,275,970
Sows kept for breeding....	412,065	374,320	434,464	439,290
Other pigs....	2,397,150	2,633,596	3,181,427	3,355,841
Total of pigs....	2,809,215	3,007,916	3,615,891	3,795,131

IMPORTS OF DEAD MEAT

Description	1919 First 7 months (Jan. 1 to July 31)	1918	1917	1914
	Cwt.	Cwt.	Cwt.	Cwt.
Beef, fresh and refrigerated	3,935,764	7,697,186	6,125,603	8,844,567
Beef, salted	36,290	14,682	44,237	29,841
Mutton	2,253,173	2,089,533	2,569,059	5,199,731
Pork	50,672	99,630	161,427	861,203
Pork, salted	13,685	11,691	22,750	261,141
Bacon	5,582,088	10,477,948	6,567,574	5,098,080
Hams	1,290,387	1,554,407	1,180,166	838,830
Meat, unenumerated:— fresh and refrigerated	685,950	690,620	664,822	813,757
salted	9,846	2,528	15,502	139,534
Meat, preserved	1,664,335	2,188,600	1,900,598	995,211
Rabbits	233,410	522,542	321,814	505,925
Total	15,755,600	25,349,367	19,573,552	23,587,820
Poultry:—	Number	Number	Number	Number
Alive	297	101	56	541,161
Dead	110,511	34,814	128,287	223,599

Beef.—No fresh beef was imported in 1918 or in the first part of 1919. Chilled beef showed a heavy decrease since 1917. Argentina and Uruguay were the principal countries of export, but in each case the figures showed a marked decline. It is noticeable that imports of chilled beef from the United States decreased from 335,803 cwt. in 1917 to 33 cwt. in 1918, while as in the two pre-

vious years the imports for Australia and New Zealand were nil.

In regard to imports of frozen beef, imports rose from 4,626,645 cwt. in 1917 to 7,532,367 cwt. in 1918. In the first seven months of 1919 the imports were 3,838,947 cwt. against 4,459,274 cwt. in the same period of 1918. The countries whence the frozen beef was consigned were as follows:—

	1919 First 7 months (Jan. 1 to July 31)	1918	1917
	Cwt.	Cwt.	Cwt.
United States	708,988	3,583,549	602,423
Argentina	2,500,688	1,879,167	1,598,030
Australia	62,921	551,609	1,107,704
New Zealand	128,415	460,289	760,094
Uruguay	211,309	186,411	171,913
Other countries	216,626	871,342	386,582

The most interesting features from the above table are the large decrease in the exports from Australia and New Zealand and the great increase in the exports from the United States in 1918. In the first seven months of 1919 the exports from the United States were 708,988 cwt. compared

with 1,978,977 during the same period in 1918, and 314,228 during the first seven months of 1917.

Mutton.—The following are the figures of frozen mutton imported from the different countries:—

	1919 First 7 months (Jan. 1 to July 31)	1918	1917
	Cwt.	Cwt.	Cwt.
New Zealand	990,775	1,234,005	1,235,275
Argentina	640,368	710,630	470,836
Uruguay	80,213	57,356	29,473
Australia	431,848	26,168	496,114
Other countries	109,969	61,374	310,748

It will be seen that, while the imports from New Zealand remained almost station-

ary, a marked decrease is noticeable in the case of Australia in 1918. However in the

first seven months of 1919, Australia exported about as much mutton as in the same period in 1917. There was a considerable increase in the exports from Argentina.

Pork.—The quantity of pork imported has considerably decreased since 1917. The

bulk was received from the United States.

Bacon and Hams.—The main feature in regard to bacon and hams is the increased quantity imported. Nearly all the supplies were received from the United States.

IMPORTS OF DAIRY PRODUCE, MARGARINE AND EGGS

Description	1919 First 7 months (Jan. 1 to July 31)	1918	1917	1914
	Cwt.	Cwt.	Cwt.	Cwt.
Butter.....	1,131,618	1,614,625	1,806,516	3,984,204
Margarine.....	67,864	302,591	1,807,806	1,529,219
Cheese.....	981,469	2,357,822	2,946,066	2,433,864
Milk, condensed:—				
Unsweetened.....	618,418	900,696	619,451	37,396
Sweetened.....	968,587	1,684,061	1,016,936	1,187,920
	Great Hundreds	Great Hundreds	Great Hundreds	Great Hundreds
Eggs.....	2,686,206	2,656,541	4,922,402	17,904,805

Butter.—Of the 1,614,625 cwt. imported in 1918, 372,572 came from New Zealand, 313,143 cwt. from Argentina, and 217,284 cwt. from Victoria. Denmark, which in 1917 furnished 622,160 cwt., only exported 40,327 cwt. to the United Kingdom in 1918. It is very noticeable that the export of butter from the continent decreased considerably in favour of countries in more distant parts of the world (Australia, New Zealand, Argentina and the United States).

Cheese.—The importation of cheese did not show a great falling off in 1918. But in the first seven months of 1919 only 981,469 cwt. were imported compared with 1,352,443 during the same period in 1918 and 1,735,417 cwt. in the first seven months of 1917. In 1918, 1,125,668 cwt. were received from Canada compared with 1,757,949 cwt. in 1917. The imports from Canada further decreased in 1919, 221,801 cwt. being received from the country from January 1 to July 31 against 400,606 cwt. during the same period in 1918.

Eggs.—A study of the figures relating to the importation of eggs shows that the United Kingdom in 1918 only imported one-seventh of the pre-war quantity. There was also a large falling off from the 1917 imports. The principal countries from which the eggs were imported in 1918 were Denmark (1,170,535 great hundreds), and Egypt (729,827 great hundreds). Russia, which

in 1914 exported to the United Kingdom 6,870,828 great hundreds, sent none at all in 1918.

Grain and Meal.—As regards the quantity of wheat and barley imported the figures for 1918 show a considerable fall as compared with 1917. The imports of wheat were 108,322,000 bushels in 1918 against 170,678,000 in 1917 and 193,997,000 in 1914. In 1918, 11,725,000 bushels of barley were imported, against 31,323,000 in 1917 and 37,437,000 in 1914. The importation of wheat flour in 1918 was almost twice as much as in 1917. The figures are 15,063,000 barrels in 1918, against 8,194,000 barrels in 1917 and 5,749,000 barrels in 1914. Oats show a comparatively small drop.

Fruits and Vegetables.—In 1918 only 410,169 cwt. of apples were imported compared with 889,755 in 1917 and 2,929,649 in 1914. In the first seven months of 1919, however, 1,855,917 cwt. were imported compared with 264,071 cwt. in the same period in 1917.

The potatoes imported in 1918 amounted to 1,896,000 bushels compared with 2,985,000 in 1917 and 6,220,000 in 1914. Practically all the potatoes imported during 1918 were received from the Channel Islands. France, which furnished one-third of the supply in 1914, has not sent any during the last two years.

IMPORTS OF FEEDING STUFFS

Description		1919 First 7 months (Jan. 1 to July 31st)	1918	1917	1914
Cotton seed.....	tons..	204,871	338,194	219,045	639,572
Flax seed or linseed.....	qrs.	1,303,862	1,310,278	1,003,431	2,451,778
Rape seed.....	"	193,160	292,442	305,505	309,241
Soya beans.....	tons	849	.....	25,025	71,161
Nuts and kernels for expressing oil.....	"	241,834	442,666	447,536	168,847
Oil seed cake.....	cwt.	.....	10,828	212,892	329,431

The shortage of feeding stuffs during the war is well borne out by the figures in the above table.

WORLD'S WHEAT CROP AND PROBABLE DISTRIBUTION IN 1919-20

BY T. K. DOHERTY

In the August issue of the Gazette, under the heading "World's Wheat Crop Situation in 1919-20 Compared with pre-war Conditions", the situation was discussed with the limited material for the 1919 crops then available. The official estimates as of September 1 indicate for the United States a reduction of 238,000,000 bushels, and for Canada a reduction of 83,000,000 bushels,

as compared with the July estimates. The United States exports for July, 1919, were also overestimated. It therefore becomes necessary to state the situation in the light of these considerable changes in the world's wheat supply. The first two pages of the article in the August issue relating to the pre-war situation stand without change and need not be repeated here.

TABLE I—WORLD'S PRODUCTION OF WHEAT.

Countries.	1919.	1918.	Pre-war five years' average 1909-13.
	Bushels.	Bushels.	Bushels.
United States	923,000,000	917,100,000	686,697,000
Canada	199,240,000	189,075,000	197,118,000
Mexico	8,000,000(a)	8,000,000	8,480,000
Argentina.	160,000,000(a)	184,270,000	147,071,000
Chili.	12,000,000(a)	12,000,000	14,000,000
Uruguay ..	7,000,000(a)	8,000,000	6,519,000
Austria ..	40,000,000(b)	40,000,000	60,840,000
Hungary ..	104,000,000(b)	103,000,000	169,646,000
Belgium.	8,000,000(b)	9,000,000	14,896,000
Bulgaria.	34,000,000(a)	34,000,000	42,440,000
Denmark.	5,200,000(b)	6,320,000	5,414,000
France	180,000,000(a)	233,784,000	317,639,000
Germany	80,000,000(a)	90,331,000	152,120,000
Greece ..	4,000,000(b)	8,000,000	4,320,000
Italy.	154,000,000(b)	176,372,000	183,336,000
Herzegovina and Bosnia	1,500,000(a)	1,500,000	2,560,000
Netherlands.	4,000,000(b)	4,823,000	4,896,000
Norway	800,000(b)	1,087,000	306,000
Luxemburg	500,000(a)	512,000	613,000
Portugal. .	6,400,000(b)	7,000,000	7,140,000
Roumania.	70,000,000(a)	70,000,000	87,793,000
Russia-in-Europe	550,000,000(a)	475,000,000	621,620,000
Russian Poland. .	15,000,000(a)	12,160,000	21,930,000
Serbia...	8,000,000(a)	8,000,000	13,800,000
Spain....	138,398,000	135,710,000	130,447,000
Sweden...	8,000,000(b)	9,004,000	7,769,000
Switzerland.	6,000,000(b)	7,095,000	3,314,000
Cyprus and Malta	2,400,000(a)	2,400,000	2,400,000
Great Britain and Ireland.	75,000,000(a)	93,178,000	59,640,000
India.	276,526,000	379,829,000	359,035,000
Japan...	25,000,000	25,593,000	24,166,000
Russia-In-Asia..	110,000,000(a)	90,000,000	151,142,000
Persia...	13,000,000(a)	13,600,000	13,600,000
Algeria...	25,000,000(a)	35,000,000	34,998,000
Egypt.	30,000,000(a)	32,555,000	34,814,000
Union of South Africa.	5,000,000(a)	8,600,000	6,520,000
Tunis.....	6,614,000	8,451,000	6,230,000
Australia	90,000,000(a)	80,846,000	90,500,000
New Zealand. .	6,000,000(a)	6,265,000	7,070,000
Totals	3,391,578,000	3,527,449,000	3,706,069,000

(a) Estimates based on condition reports.

(b) Broomhall's Corn Trade News.

TABLE II—RECAPITULATION BY CONTINENTS.

	1919.	1918.	Five year's average
North America..	1,130,240,000	1,114,175,000	892,295,000
South America.	179,000,000	204,270,000	167,590,000
Europe....	1,495,198,000	1,528,275,000	1,918,109,000
Asia.	424,526,000	509,022,000	547,943,000
Africa.	66,614,000	84,606,000	82,562,000
Australia	96,000,000	87,101,000	97,570,000

North America exceeded its pre-war production, therefore, by 237,945,000 bushels, while Europe's total dropped 423,000,000 and Asia's total, owing chiefly to the 100,000,000 deficiency in India, dropped 123,000,000 bushels.

It appears from the production table that the 1919-20 figures, including the prospective crops of the Southern Hemisphere, are 314,000,000 bushels less than the pre-war production and 136,000,000 bushels less than the figures for 1918. All the important importing countries, except Great Britain and Spain, produced smaller crops than in the pre-war period, while exporting countries produced more abundantly, notably the United States. The total world's wheat in 1919-20, viz. 3,391,578,000 bushels, compares with a total for the same countries of 3,969,000,000 bushels in 1913, and of 3,717,000,000 bushels in 1912. It therefore is 325,000,000 bushels less than the crop of 1912 and 577,000,000 bushels less than the record crop of 1913. The 1913 crop was

250,000,000 bushels in excess of that of 1912, which was also a record crop up to 1912.

The drop from the July 1 estimate in North America therefore furnishes cause for serious concern. It is well to reflect how easily the enormous crop of 1913 was absorbed in 1914, and that there is a tendency already well established in Australia and Argentina to produce less wheat. There is therefore no justification for assuming that the present crop will be more than sufficient to provide for immediate needs without providing for carry-over stocks which have been entirely lacking in the last two years. On examination of the 1919 crop there appears a wide disparity between the deficiency countries and the surplus countries, and the world's shipping will be taxed to its utmost to effect the distribution of the surplus crops.

Demand.—The demand situation for the world's grain year beginning August 1, 1919, and ending July 31, 1920, works out approximately as follows:

TABLE III.

Countries.	Indicated crop estimated Aug. 1st 1919	Normal consumption	Indicated requirements.	Probable distribution
	Bushels.	Bushels.	Bushels.	Bushels.
Great Britain and Ireland	75,000,000	276,000,000	200,000,000	180,000,000
France	180,000,000	361,000,000	150,000,000	130,000,000
Italy	154,000,000	237,000,000	95,000,000	75,000,000
Spain	138,000,000	136,000,000		
Portugal	6,000,000		4,000,000	3,000,000
Greece	4,000,000		15,000,000	10,000,000
Holland, Switzerland, Norway, Sweden and Denmark	24,000,000		50,000,000	35,000,000
Belgium	8,000,000	65,000,000	(a) 60,000,000	40,000,000
Egypt, Mesopotamia, Constantinople and Turkey			20,000,000	15,000,000
Germany	80,000,000	221,000,000	130,000,000	85,000,000
Austria-Hungary and Czecho-Slovakia	144,000,000	241,000,000	80,000,000	50,000,000
Total for Europe			804,000,000	623,000,000
Ex-Europe			(b) 60,000,000	42,000,000
World's aggregate requirements			864,000,000	665,000,000

(a) Ample provision has to be made for armies occupying adjacent territory and for Belgium's reconstruction needs. The normal import would be 50,000,000 bushels.

(b) Pre-war imports were 98,000,000 bushels

In the preceding indicated requirements India,—which has to this date already imported from Australia six million bushels and earlier in the year exported about the same amount—does not figure at all. It is hoped that she may recoup herself for a hundred million deficiency in the last crop, by a surplus in the crop which is now being seeded under conditions at first favourable, but latterly uncertain. Neither do the above-mentioned indicated requirements

take into consideration the probable export to Northern Russia and Petrograd. Neither do they provide for carry-over stocks in the importing countries. The "probable distribution" column in the preceding table shows the scaling down of requirements to conform to the changed crop situation in North America. What the situation is in the surplus countries is shown in the following table:

TABLE IV.

Countries.	Carry-over at Aug. 1st, 1919 beginning of crop year.	Production 1919.	Home needs and waste.	Probable export.	Carry-over at August 1st 1920
	Bushels.	Bushels.	Bushels.	Bushels.	Bushels.
Canada.....	7,000,000	199,000,000	89,000,000	115,000,000	2,000,000
United States..	22,000,000	923,000,000	635,000,000	300,000,000	10,000,000
Argentina.....	156,000,000	160,000,000	78,000,000	150,000,000	88,000,000
Australia....	138,000,000	90,000,000	50,000,000	100,000,000	78,000,000
Totals.....	323,000,000	1,372,000,000	852,000,000	665,000,000	178,000,000

It will be seen that provision is made for reducing the carry-over stocks in 1920 by 145,000,000 bushels, but still leaving a generous allotment of stock in the far distant supply markets where it cannot be hoped that the available shipping can entirely clean up the long standing old stock in Australia and Argentina. In fact the

crucial test of the whole situation—the realization of the above-mentioned exports—depends upon the shipping facilities, which will have to handle over 100,000,000 bushels, in excess of those of the preceding year besides coping with the enormously increased general trade.

TABLE V—MONTHLY EXPORTS OF WHEAT.

(Including Flour for Canada and the United States.)

(Thousands of Bushels.)

Months.	Canada.	United States.	India.	Australia.	Argentina	Totals for five countries.
1918-19.						
August.....	3,790	19,496	1,172	3,620	19,004	47,082
September...	3,541	28,347	900	2,980	6,640	42,408
October.....	8,324	24,531	1,012	2,772	4,504	41,143
November....	7,023	21,989	1,392	3,892	2,672	36,968
December....	13,426	33,539	.....	3,216	2,820	53,001
January....	10,164	22,103	.....	2,532	3,964	38,763
February....	4,149	15,842	.....	6,008	2,064	28,063
March....	6,766	20,314	.....	11,324	3,224	41,628
April....	6,613	31,127	.....	9,500	5,564	52,804
May....	14,577	26,342	.....	12,100	8,116	61,135
June....	11,612	35,484	.....	11,176	10,280	68,552
July....	13,626	13,624	6,760	14,852	48,862
Totals for year 1918-19.....	103,611	292,738	4,476	75,880	83,704	560,409

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DEPARTMENT OF AGRICULTURE

The Agricultural Gazette of Canada

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AGRICULTURE, THE ROCK OF PROSPERITY

BY THE HON. S. F. TOLMIE, MINISTER OF AGRICULTURE

AGRICULTURE—Canada's leading industry and the world's greatest science—is the rock on which we must establish Canada's future prosperity and it must be the source from which we will derive the wealth necessary to meet our financial obligations. Statistics show us that our financial debt, which on March 31, 1914, was \$340,000,000, approximated on the same date in 1918, \$1,500,000,000, and the yearly interest, which on the former sum was \$12,000,000, becomes on the latter debt, \$77,000,000. There at a glance is Canada's financial burden. It is appalling! However, I am confident that this Dominion, through the development of her natural resources, will in time wipe out her debt. Timbers, fisheries and mines all contribute their part of the revenue, but by far the greatest returns will be derived from agriculture, which industry we must continue to establish in permanency and increase in magnitude.

The former statements indicate the dark side of our situation; there is a brighter vision. Looking over our trade reports we find that our exports of food, which in 1914 amounted to \$196,909,312, have increased to \$358,746,756 by 1919. We are a producing nation and we find that it pays to export. In this connection we must remember that our markets deserve the closest attention. Not only must we bring about a better interprovincial relationship in commerce and continue our dealings with the neighbouring Republic, but we must also develop the overseas markets and especially establish trade with the Mother Country. I believe that the time has arrived when the agricultural interests of Canada should have the very best man available located in London to look after our business and to see that our goods are placed on the market in the best possible shape. It is the aim of the government to locate for the farmer the best markets, keep him apprised of their state, and informed on all points pertinent to his business. I favour the enlarging of our cold storage facilities for overseas shipping and believe that this will be a step in assisting us to compete with foreign countries. We cannot control export prices, but we seek to place our goods economically on foreign markets and thus increase our ultimate returns.

One of the greatest responsibilities that falls on either the federal or provincial departments of agriculture is the conservation of the great wealth that lies in the virgin soil. Innumerable considerations are involved in this one problem but the whole affair can be accomplished if we engage in mixed farming with live stock as a basis. This is the fundamental principle underlying success in agriculture. We must establish our name for quality in live stock as we have done for quality in grain. Quality must be our slogan if we are to successfully compete with the Argentine. It is by better breeding, better feeding, and better finishing that we can attain a position second to none in the live stock world. The scrub sire is doomed and is now being prepared for the block. An accredited system of herd inspection is being established with a view to stamping out disease and insuring health in our herds. In whatever direction our trade develops it is our duty to see that only first class stock,

free from disease of any kind, is exported.

How can agricultural production be increased? During the past five years the industry has grown through the concerted efforts of loyal citizens, who co-operated, organized, and laboured under the stress of war conditions. This production must be continued and increased if we are to meet our obligations with our products. We have the land, we know how to produce, but we need men. We need immigrants, but we want the kind that will promote harmony, unity, and industry throughout the Dominion. Our immigrants must be selected and only those who will adopt our standards of living, and respect our laws can be considered desirable people to be adopted as Canadian citizens. The many difficulties we now face can be overcome if we labour in harmony for the purpose of meeting our financial obligations with our agricultural products.

SEED CONTROL ACT REGULATIONS

ON the recommendation of the Minister of Agriculture, the regulations under the Seed Control Act that have been enacted by Order-in-Council at various times have been revised and consolidated by Order-in-Council dated September 10, 1919.

REGULATIONS MADE IN PURSUANCE OF THE SEED CONTROL ACT.

Noxious Weeds.

1. The species of farm weeds which shall for the purpose of the above mentioned Act be included within the meaning of the term "Noxious Weeds" shall be as follows:—

- Wild Oats (*Avena fatua* L.)
- Twitch or Quack Grass (*Agropyron repens* L. Beauv.)
- Docks (*Rumex crispus* L. and *Rumex obtusifolius* L.)
- Russian Thistle (*Salsola Kali* L. Var. *Tenuifolia* G. F. W. May.)
- Purple Cockle (*Agrostemma Githago* L.)

Campions, including White Cockle (*Lycnis alba* Mill.)

Night-flowering Catchfly (*Silene noctiflora* L.) and Bladder Campion (*Silene latifolia* Mill, Britten & Rendle.)

Cow Cockle (*Saponaria Vaccaria* L.)

Stinkweed (*Thlaspi arvense* L.)

False Flax (*Camelina* species).

Ball Mustard (*Neslia paniculata* (L.) Desv.)

Wild Radish (*Raphanus Raphanistrum* L.)

Wild Mustard (*Brassica arvensis* (L.) Ktze) and other wild Brassica species.

Hare's-ear Mustard (*Conringia orientalis* (L.) Dumort.)

Tumbling Mustard (*Sisymbrium altissimum* L.)

Wild Carrot (*Daucus Carota* L.)

Field Bindweed (*Convolvulus arvensis* L.)

Dodder (*Cuscuta* species) in alfalfa seed.

Blue Bur or Stickseed (*Lappula Echinata* Gilibert).

Blue Weed (*Echium vulgare* L.)

Ribgrass (*Plantago lanceolata* L.)

Ragweed (*Ambrosia* species).

Ox-eye Daisy (*Chrysanthemum Leucanthemum* L.)

Canada Thistle (*Cirsium arvense* (L.) Scop.

Perennial Sow Thistle (*Sonchus arvensis* L.)

Tolerance within Meaning of "Free."

2. The maximum proportion of seeds of noxious weeds that may be tolerated in any seeds without affecting their character as being free from the seeds of the said weeds within the meaning of section 6 of the said Act, shall be as follows:

(a) For seeds of Oats, Barley, Wheat, Rye, Buckwheat, Mangels, Vetches or Beets and other seeds approximately similar in size, one weed seed in one pound avoirdupois.

(b) For seeds of Flax, Millet or other seeds approximately similar in size, one weed seed in one ounce avoirdupois.

(c) For seeds of Sweet Clover, White Clover, Crimson Clover and grasses, five weed seeds in one ounce avoirdupois.

3. The maximum proportion of seeds of noxious weeds that may be tolerated in any seeds without affecting their character as being free from the said seeds within the meaning of grade Extra No. 1 as defined in paragraph (a) Section 8 of the said Act and Clause 4 hereof, shall be one noxious weed seed in one ounce avoirdupois, provided, however, that the weed seed tolerated in this proportion shall not include those of Twitch or Couch Grass, Bladder Campion, Wild Mustard, Wild Carrot, Ox-eye Daisy or Perennial Sow Thistle.

Seeds which may be sold under special grades

4. The seeds of sweet clover, white clover, grasses and millet may be merchandised under the regulations and grade designations defined for timothy, red clover, and alfalfa seed in sections 7 and 8 of the said Act.

5. Cereal grain, flax-seed, and corn for seeding purposes may be merchandised under the grade standards and regulations defined in clauses 6, 7, 8, 9, 10, 11 and 12 of these regulations, and any grain so merchandised which contains more noxious weed seeds or is of lower germination than is defined by the standard of the grain designated shall be deemed to be sold, offered, exposed or had in possession for sale in violation of sections 6 and 10 of this Act.

Seed Grade Standards for Wheat, Oats, Barley and Rye.

6. Extra No. 1 Seed Wheat, Seed Oats, Seed Barley or Seed Rye shall consist of a correctly named, and approved variety, shall be practically free from other varieties, shall contain more than 50 kernels per pound of other grain, including black or domestic oats or yellow varieties of oats, shall be free from noxious weed seeds, shall be well cleaned and graded to remove light and small kernels, common weed seeds and other foreign matter; shall be sound and of good colour; shall weigh not less than two pounds per measured bushel more than the standard weight for grain of the kind and shall be capable of germinating at least 90 per cent.

7. No. 1 Seed Wheat, Seed Oats, Seed Barley and Seed Rye shall consist of at least 95 per cent of one variety or type distinguishable from an examination of the threshed grain; shall be reasonably free from other kinds of grain; shall be free from noxious weed seeds within the meaning of the said Act (see paragraph (a) clause 2 of these regulations); shall be well cleaned and graded to remove light and small kernels, common weed seeds and other foreign matter; shall be sound and of good colour; shall weigh not less than the standard weight per measured bushel of grain of the kind and shall be capable of germinating at least 80 per cent.

8. No. 2 Seed Oats and Seed Barley shall be the same as No. 1 in all respects except that it may contain slightly more foreign matter than is permitted in grade No. 1, but not including any excess of noxious weed seeds, excepting wild oats, which may be tolerated in a proportion not exceeding ten in one pound of grain.

Grade Standards for Flax-seed.

9. No. 1 Flax-seed for seeding purposes shall be mature, sound, dry and sweet; shall be practically free from seeds of other cultivated plants; shall be free from noxious weed seeds within the meaning of the said Act (see paragraph (b) clause 2 of these regulations); shall be well cleaned and graded to remove light and damaged kernels, common weed seeds and other foreign matter, and shall be capable of germinating at least 90 per cent. Certificates for this grade may be issued for Canadian Fibre Flax-seed, provided that the seed is accompanied by an affidavit of pedigree or certificate of registration that is satisfactory to the Chief Inspector of Seeds.

10. No. 2 Flax-seed or Canadian Fibre Flax-seed shall be the same as No. 1 in all respects, except that it may contain noxious weed seeds in a proportion not exceeding five in one ounce of flax-seed.

Grade Standards for No. 1 Seed Corn.

11. No. 1 Seed Corn, whether on the cob or shelled, when sold, offered, exposed or held in possession for sale; for seeding in Canada shall be plainly marked with:

- (a) the correct variety name, and
- (b) the province or state where grown.

No. 1 Seed Corn on the cob shall consist of sound, well-developed ears that are reasonably uniform and typical specimens of the variety named, shall be well cured, and shall be capable of germinating at least 95 per cent.

No. 1 Seed Corn shelled shall consist of sound, reasonably uniform, and typical kernels of the variety named, shall be well cleaned and graded, shall contain not more than 16 per cent moisture, and shall be capable of germinating at least 95 per cent.

Inspection of Seed Grain and Issuing of Certificates.

12. (a) Certificates for seed grain grades shall be issued by the Chief Inspector of Seeds in respect to seed wheat, oats, barley, rye, or flax seed that is received into or shipped out of any elevator or cleaning house which, in the opinion of the Seed Commissioner, is suitably equipped for cleaning and handling seed grain, and which is under the direct control and operation of the Government of Canada or of the Government of one of the provinces of Canada, or other elevators or cleaning houses at the discretion of the Seed Commissioner. Such grain, when received into these elevators or cleaning houses, may be accepted for seed subject to recleaning, provided that in the opinion of the seed inspector the grain may be cleaned to conform to the standard of any one of the grades for seed grain herein defined, and provided further that no grain shall be accepted for seed, or intake seed certificate issued therefor, if in the opinion of the seed inspector the grain would require excessive dockage in process of cleaning for seed purposes, or is otherwise unsuitable for seed.

(b) Certificates for seed grain grades shall be issued by the Chief Inspector of Seeds at any of the Canadian Government Seed Laboratories on control samples representing the bulk lot of seed grain from which the sample has been drawn by the owner for the purpose of such inspection. Control samples of seed grain for grading shall consist of not less than one pound and shall be addressed to the Seed Laboratory, postage prepaid, and be kept on file at the Seed Laboratory at least six months.

(c) Certificates for Extra No. 1 Seed Wheat, Oats, Barley or Rye, shall not be issued by the Chief Inspector of Seeds on any grain received and cleaned at Government elevators or on control samples addressed to and filed at any of the seed laboratories, unless evidence is furnished to the satisfaction of the Chief Inspector of Seeds that the grain in question fully conforms to the standard of quality defined for this grade in respect of variety, name, and origin.

Certificate Number to be Marked.

13. Each and every lot of seed grain, corn, clover, grass or other seed which is officially graded by a control sample or otherwise, and is thereafter merchandised under the grade designated on the certificate issued thereon, shall have the certificate number plainly marked on the shipping invoice and wherever the grade designation of such seed is stated.

Subsequent Tests on Graded Seed.

14. It shall be the privilege of the purchaser of any seed sold under a grade designated to submit a true and representative sample of the bulk lot received, together with the certificate number for check test and comparison by the Chief Inspector of Seeds with the control sample on which the certificate is based. Because of the natural variation between different samples of the same bulk lot of seed, tests on other samples may differ slightly from the one on which the original certificate is based, and the Chief Inspector of Seeds is therefore authorized at his discretion to confirm the original grading on any lot of seed when a check test shows a sample to be slightly below the standard of the grade designated, provided that there is evidence to his satisfaction that the sample submitted for check test is from the same lot of seed as the control sample on which the original certificate is based, and that the lot of seed in question was well bulked and that the difference in tests was due to unavoidable variation in sampling.

Qualifying, Designation and Labelling.

15. If any seed being merchandised under a grade number is marked with a qualifying designation, such as "No. 1 Purity" when the seed is grade No. 2 for qualities other than weed seed content, such designation shall be placed after and less conspicuously than the standard grade designation. Failure to comply with this regulation shall be deemed a violation of section 7 of the said Act.

16. The labelling of any seeds with a grade designation, names of noxious weed seeds contained, or other information required by the Seed Control Act or these regulations, shall be done in the language principally used by the purchaser. Labelling in English, seeds intended for purchasers whose business language is principally French, or labelling in French, seeds intended for purchasers whose business language is principally English, shall be deemed a violation of the said Act.

Germination Standard for Good Seed.

17. The percentage standards of vitality for good seed of the various kinds of cereals, grasses, clovers, forage plants, flax, field root, and garden vegetable crops, shall be as follows:

	Percentage Germination.
Cereal grains, flax, Indian corn and millet	95
Peas, beans and vetches	90
Red clover, alsike, alfalfa, white and other clovers	95
Timothy, cock-foot, meadow fescue, perennial and Italian rye, western rye, brome and red top	90

All other grasses	80
Mangel and beet balls	90
Turnip, swede, rape, radish, cabbage and cauliflower.	90
Spinach, carrot and celery.	80
Parsley and parsnip.	65
Onion, leek and tomato.	90
Lettuce.	95
Cucumber, melon, squash and other cucurbits.	90

Penalties.

18. Any person contravening or failing to observe, abide by, or perform any of the provisions of these regulations, or offending against them, shall be liable to a penalty not exceeding fifty dollars, to be recoverable on summary conviction.

AGRICULTURAL RESOURCES OF CANADA

THE following notes are taken from "Fifty Compact Facts" compiled by the Natural Resources Intelligence Branch of the Department of the Interior, Ottawa, 1919. They suggest the magnitude of the agricultural industry in the Dominion:--

WHEAT

The Canadian extension of the North American plain, and the plains of northern Russia are the world's reserve granaries for hard spring wheat. The famous Canadian varieties are 'Red Fife,' 'Marquis' and 'Prelude.' 'Marquis' has been propagated from a single plant isolated at the Ottawa Experimental Farm in 1903. Record production of Canadian wheat 1915--374,670,000 bushels.

OATS

The yield of harvested merchantable oats in 1918 was 382,994,000 bushels, mostly used in feed for stock. The record yield is 428,257,000 bushels in 1915.

FLAX

Southern Ontario had 15,925 acres in flax in 1918, 4,000 in 1915. The linen industry centres here and in southern Quebec. Flax grown on 200,000 acres in Prairie Provinces is

used for linseed and fodder. Climate of southwest British Columbia and Maritime Provinces well suited for fibre. Protective duty 20 to 35 per cent.

FRUIT

Strawberries and raspberries in commercial quantities are specialties of southeastern Vancouver Island and the Fraser delta, B.C. Jam factories contract for all the fruit not shipped in crates. The famous fruit districts of Canada are the Annapolis Valley in Nova Scotia, the Niagara Peninsula in Ontario, and the Okanagan and other valleys in British Columbia. The market is world wide. The social conditions, the beauty of the homes and the abundance of good land invite inquiry.

FARM LANDS

Of the 179,000,000 acres fit to farm in the 454,000,000 acres of Manitoba, Saskatchewan and Alberta, 26,000,000 are under crop and 25,000,000 under live stock. Settlers are needed for 128,000,000 acres surveyed farm lands including 25,000,000 still open for homestead entry. The total area of land fit for tillage is estimated at 302,200,000 acres. In 1918 one-sixth (51,427,190 acres) was under crop.

PART I

Dominion Department of Agriculture

THE EXPERIMENTAL FARMS

CEREAL DIVISION

DISTRIBUTION OF SEED GRAIN 1919-1920

BY P. R. COWAN, ASSISTANT IN THE CEREAL DIVISION

A FREE distribution of superior sorts of grain will be made during the coming winter to Canadian farmers by the Experimental Farms Branch. The samples will consist of spring wheat (in about 5 lb. samples), white oats (about 4 lb.), barley (about 5 lbs.), field peas (not garden peas) about 5 lbs., field beans (early ripening, only for districts where the season is short) about 2 lbs., flax for seed and flax for fibre (about 2 lbs. each.)

The Cereal Division of the Experimental Farms Branch has improved many of the old varieties of grain and introduced many new varieties. The best of them have been multiplied and propagated under direct supervision of responsible officers on the Experimental Farms, both East and West. This seed will form the bulk stocks from which the various samples will be taken. The seed is therefore, the purest and best that is obtainable. The Experimental Farm having only a limited stock of these grains will distribute them free to all *bona fide* farmers in Canada, as long as the stocks hold out.

Besides the usual distribution of wheats, oats, barleys, and peas this year, there have been added beans, flax for seed and flax for fibre. The beans recommended are for districts where the common white beans will not mature in the average season. The bean being a brown bean is not recommended as a commercial varie-

ty, but to fill a much needed vacancy in the more northern districts where early maturity is essential. The flax for fibre is only a limited stock and will only be sent to districts where flax is grown for fibre at all extensively. The flax for seed is also limited and the restrictions will be somewhat stricter than with the other grains. Of the other grains to be distributed Ruby wheat and Liberty oats are perhaps the most outstanding. Ruby wheat in the average season will ripen about 8-10 days earlier than Marquis and will be for districts where early wheats are required. Liberty oats, a new hullless variety of oats, is recommended as a human food and excellent for young stock, this oat yields a little less than other oats and will be sent to districts where it is most likely to be of greatest value.

Applications must be made on a printed form which will be supplied on application to the Dominion Cerealists, Central Experimental Farm, Ottawa. No application forms will be supplied after February 1, 1920. Farmers are advised to send at once for forms so as not to be disappointed, as has been pointed out, the stock being limited, and the allotment of samples being in the order of application.

The object of this distribution is two-fold. So that the farmer may get a small sample of good seed to start his seed plot correctly, and also, so that the Central Division may find

out how their improved grains will behave under all conditions of soil and climate. Therefore, it is necessary that all the information asked for on the application form should be fully answered. This also holds true with the report forms, which each man is asked to fill out, after he has grown his sample.

Only one sample will be supplied to each applicant. No applicant who

has already received a variety will receive the same variety again, unless a very good reason is given for repeating, this to be left to the discretion of the Dominion Cerealists. All applications should be addressed to the Dominion Cerealists, Central Experimental Farm, Ottawa (no postage is required.) Apply at once, remembering no application forms will be sent out after the 1st of February.

DIVISION OF BOTANY

A DISEASE OF PEARS, NEW TO THE CONTINENT OF AMERICA

Phytophthora cactorum (Leb. et Cohn) Schroeter.

IN 1870 two biologists, Lebert and Cohn, of Breslau, Germany, described the causal agent of a destructive rot of various Cacti, and gave to it the above name.⁽¹⁾ In 1882 the same fungus was found by Hartig of Munich,⁽²⁾ causing a disease in maple, pine, larch, and fir seedlings. In 1906, in Switzerland, the disease was observed in apples and pears. It then was recorded in 1910 on pears in Bohemia, and, finally, in 1915 it was discovered in apples near Ithaca, N.Y.⁽³⁾ The disease is widely distributed in Europe, and has been recorded from Japan. The fungus attacks the greatest variety of plants, and seems more common in rainy seasons.

Specimens of pears were received in September, 1919, from Kentville, Nova Scotia, which showed a rather unusual rot. The nearly full grown pears showed from one to more large, circular, dark brown spots (Fig. A) resembling the common soft rots, but unusual, because the spots were not soft, but quite firm. The pears of one tree only were affected, and, on microscopic examination, it was found that the rot was due to the fungus

above referred to, which grew profusely from the affected tissues (Fig. B).

In the few cases where the disease has been observed, the fruit is affected only on low hanging branches. This fact suggests that the infection may originate from surrounding infected vegetation. In the early stages the rot does not extend very deeply into the tissues, but soon a large number of other organisms, yeasts, bacteria, and fungi, appear, and the pear becomes a soft rotten mass.

The fungus has two types of reproductive organs, the typical *Phytophthora* conidium (sporangium) (Fig. C) producing motile swarm spores, and the characteristic resting spores (Fig. D). The former, no doubt, cause rapid dissemination of the disease during the vegetative period. The latter spores remain dormant in the decayed tissues over winter, and start the fungus on its seasonal development the following spring.

As control measures, it is suggested to avoid branches loaded with pears hanging low above ground, and to prop them up. All fruits showing such or similar rots should be carefully collected, and destroyed by fire,

(1) Lebert, H. und F. Cohn. Ueber die Fäule der Cactusstämme. Beitr. zur Biologie der Pflanzen. 1: 51-57. 1871.

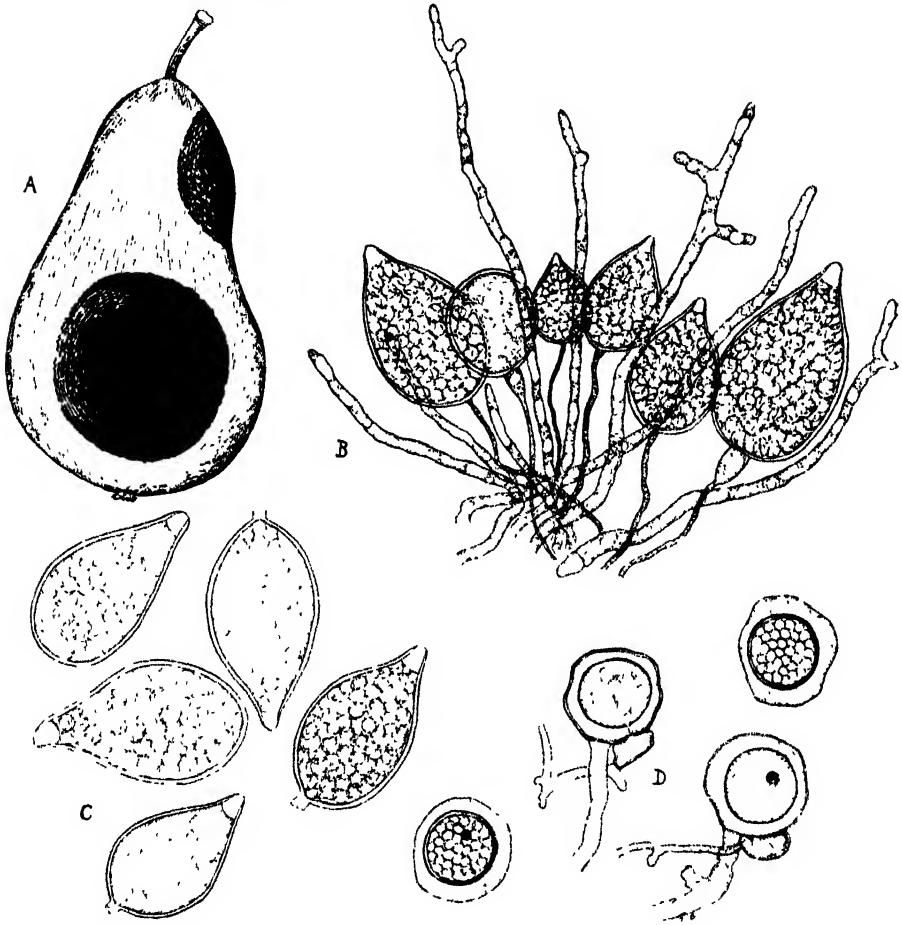
(2) Hartig, Robert. Die Buchencotyledonen Krankheit. Zeitschr. Forst-u. Jagdwirtschaft 8: 117-123. 1876.

Phytophthora omnivora (*Phytophthora Fagi* und *Peronospora Sempervivi*). Lehrbuch der Baumkrankheiten. 42-46. 1882.

(3) Whetzel, H. H. and J. Rosenbaum. The *Phytophthora* Rot of Apples. Phytopath. 6: 89-90. 1916.

particularly any that may have fallen to the ground. The weeds, etc., should be kept down around the trees, so that the fungus may find

no host plant near the trees. Fruits and other infected material allowed to fall to the ground are sure to perpetuate the disease.



- A. A diseased pear showing two rot spots.
 B. A portion of the fungus covering the infected spots.
 C. The conidia (sporangia) of *Phytophthora cactorum*.
 D. Mature resting spores (oospores—female organs), and resting spores with their antheridia (male organs).

HEALTH OF ANIMALS BRANCH

ACCREDITED HERDS

BY DR. F. TORRANCE, B.A., D.V.S., VETERINARY DIRECTOR GENERAL

THE establishment of accredited herds in Canada is a long step towards the eradication of Bovine Tuberculosis. The Health of Animals Branch will carry out the provisions of this measure.

The plan adopted is practically identical with that established in 1917 by the Bureau of Animal Industry of the United States; in fact it is essential that the two plans, that of Canada and the United States, should be as nearly uniform as possible, for the reason that our certificates accompanying cattle from accredited herds are to be accepted in lieu of tuberculin tests by the officials of the United States, and our officials will accept similar certificates from the Bureau officers. Relief from tuberculin test certificates accompanying export shipments should facilitate to a large extent our live stock trade with the United States, not only by removing a vexatious regulation but by ensuring to the purchaser that he is getting animals from a really healthy herd rather than individuals which have merely passed a successful test.

It will, of course, be some time before the full effect of this accredited herd system will be felt. Herds must have passed two annual or three semi-annual tests without a reactor before they can be fully accredited, and it is not expected that a large number of herds will immediately be placed under test. As the advantages of the system become apparent, from the experience of successful owners, we may look forward to a large number being enrolled. The system in the United States has met with so large a measure of success that the resources of the Bureau and of the States are now severely taxed to comply with the requests for the testing of herds.

Owners of pure bred herds are invited to communicate with the Veterinary Director General, who will send them forms of application for enrolment in the accredited herd list, and when these necessary preliminaries are fulfilled the Health of Animals Branch will send inspectors to conduct the test. Any reactors must be immediately removed from the herd and may be slaughtered under the provisions of the Animal Contagious Diseases Act, with the compensation provided in clauses 6 and 7.

The maximum compensation which can be awarded under this clause is \$166 66 for pure bred animals, and in this case the animal must have an assessed value of at least \$250. Animals of less value will bring less compensation, the amount of compensation being two-thirds the assessed value.

As the owner is permitted to retain whatever may be realized from the sale of the hide and carcass, this compensation will in many cases be a considerable part of the value of the animal. In dealing with high priced breeding stock, however, the owner may consider the advisability of removing the animal from the herd and maintaining it in isolation under the Bang system or other approved method. The Department will not object to such a method of dealing with valuable reactors, but will insist that they are rigidly segregated, so that no spread of infection from them need be feared.

Following are the regulations for the establishment and maintenance of tuberculosis-free accredited herds of cattle as fixed by Order in Council dated Sept. 20., 1919:—

THE REGULATIONS.

1. A tuberculosis-free accredited pure-bred herd is one which has been tuberculin

tested by the subcutaneous method, or any other test approved by the Veterinary Director General, and applied by the regularly employed veterinary inspectors of the Health of Animals Branch of the Federal Department of Agriculture. Further, it shall be a herd in which no animal affected with tuberculosis has been found upon two annual or three semi-annual tuberculin tests, as above described, and by physical examination.

2. The entire herd, or any cattle in the herd, shall be tuberculin tested or retested at such time as is considered necessary by the Veterinary Director General.

3. No cattle shall be presented to the tuberculin test which have been injected with tuberculin within 60 days immediately preceding or which have at any time reacted to a tuberculin test.

4. No herd shall be classed as an accredited herd in which tuberculosis has been found by the application of the test, as referred to in paragraph 1, until such herd has been successfully subjected to two consecutive tests with tuberculin, applied at intervals of not less than six months, the first interval dating from the time of removal of the tuberculous animals from the herd.

5. Prior to each tuberculin test satisfactory evidence of the identity of the registered animal shall be presented to the inspector. Any grade cattle maintained in the herd, or associated with animals of the herd, shall be identified by a tag or other markings satisfactory to the Veterinary Director General.

6. All removals of registered cattle from the herd, either by sale, death or slaughter, shall be reported promptly to the said Veterinary Director General, giving the identification of the animals, and, if sold, the name and address of the person to whom trans-

ferred. If the transfer is made from the accredited herd to another accredited herd, the shipment shall be made only in properly cleaned and disinfected cars. No cattle shall be allowed to associate with the herd which have not passed a tuberculin test approved by the Veterinary Director General.

7. All milk and other dairy products fed to calves shall be that produced by an accredited herd, or, if from outside or unknown sources, it shall be pasteurized by heating to not less than 150 F. for not less than 20 minutes.

8. All reasonable sanitary measures and other recommendations by the federal authorities for the control of tuberculosis shall be complied with.

9. Cattle from an accredited herd may be shipped to the United States, accompanied by the certificate of the Veterinary Director General, without further tuberculin test for a period of one year, subject to the rules and regulations of the State of destination.

10. Strict compliance with these methods and rules shall entitle the owner of tuberculosis-free herds to a certificate, "Tuberculosis-Free Accredited Herd," to be issued by the Veterinary Director General. Said certificate shall be good for one year from date of test unless revoked at an earlier date.

11. Failure on the part of owners to comply with the letter or spirit of these methods and rules shall be considered sufficient cause for immediate cancellation of co-operation with them by the Federal officials.

12. Whenever in carrying out this order it is necessary to slaughter an animal or animals for the eradication of tuberculosis from a herd, the animal or animals shall be valued and compensation awarded as provided in sections 6 and 7 of The Animal Contagious Diseases Act.

DEVELOPMENT OF AGRICULTURAL EDUCATION

The development of agricultural education, that is a scheme of education suitable to the needs of the boys and girls in the country, is one of the most far-reaching movements any government has ever made, because it has to do with the building up of that part of our community having most to do with the welfare of a nation. In the reconstruction after the war this part of the community will be the steadying influence towards a more normal condition. Agricultural education which is carried on now in about 1,500 schools (nearly all in the country) in Ontario, is reaching a large number of the rising generation.

Dr. J. B. Dandeno,
Inspector of Elementary Agricultural Classes.

PART II

Provincial Departments of Agriculture

STANDING FIELD CROP COMPETITIONS

Half a bushel of grain taken from a large field, carefully cleaned, graded and exhibited, is no sure evidence of superior farming methods, but to exhibit a five or ten acre field of superior crop is a real test of the farmer's skill and is worthy of recognition. In the different provinces arrangements have been made whereby financial assistance is given to assist in holding field crop competitions. These competitions are carried on under the supervision of the Dominion Department of Agriculture and the funds are partly provided through the Agricultural Instruction Act. In *The Agricultural Gazette* of July, 1918, a brief statement of the history of field crop competitions, seed fairs, and provincial seed exhibitions outlines the aim, method, and system of the carrying on of this department of agricultural work. The following articles from the provinces show what has been done in this work during the past season.

QUEBEC

BY OSCAR LESSARD, SECRETARY FOR AGRICULTURE

THE increased assistance which has been given this year by the Quebec Department of Agriculture, with the co-operation of the Dominion Department at Ottawa, for standing crop competitions, has created unprecedented interest on the subject among the farmers of our province.

In past years, with the customary grant, an agricultural association would only hold one standing crop competition or, at the outside, two, but this year, with the increased assistance, each association has been able to organize at least five competitions. The number of contests that can be organized by an association has been fixed as follows:—

Societies numbering 500 members or more: five competitions.

Societies numbering 400 members and under 500: four competitions.

Societies numbering 300 members and under 400: three competitions.

Societies numbering 200 members and under 300: two competitions.

Societies numbering less than 200 members: one competition.

The crops selected for the competitions were the following: wheat, oats, barley, peas, corn fodder, potatoes, clover, beans, and timothy.

Many associations have taken advantage of this offer and more than 180 competitions were held; the number of competitors entered was over 3,000.

A fact to be recorded, is that some associations which, owing to the limited number of their members, were only entitled to a small number of competitions, have arranged for additional ones and given prizes out of their own funds to the winners. This fact clearly demonstrates the efficiency and popularity of such contests.

As the main object of these contests is to encourage farmers to produce choice seed and thus increase the yield of farm crops, it may be taken for granted that farming practices are gradually and steadily being improved in our country, with a view to producing good seed grain.

MANITOBA

A GREATER interest has been manifested in the standing crop competition this year than ever before. There was a time when, owing to the great natural fertility of our western soils, almost any kind of seed would produce a fair crop. The gradual depletion of this stored-up fertility has emphasized the necessity of improved agricultural methods, thus the need of pure clean seed of high yielding quality has become generally recognized.

The standing crop competition has been the chief means of calling farmers' attention to the need of good seed. This year, our judges were asked to call contestants' attention to the advisability of securing better seed, where low score was due to poor

seed. A notable feature this year, was the number of requests the judges received for information where high class seed could be secured. We had the judges report fields especially suitable for seed. These were listed, and the growers advised to retain the grain from them, for seed. A good deal of this seed will be sold through our seed exchange.

Standing crop competitions were held at twenty-two points, this year, with a total of three hundred and fifty competitors. Ten competitors are required before a competition can be held.

Owing to the rust and continued heat, the damage to the quality and yield of grain was so great in some districts, that the competitions were cancelled.

SASKATCHEWAN

BY JOHN G. RAYNER, B.S.A., ACTING DIRECTOR OF EXTENSION DEPARTMENT

WE have no provincial standing field crop competition but local competitions are put on by various agricultural societies throughout the province. These include standing fields of wheat, oats, barley, flax, rye, and grasses, and plots of potatoes are also entered. Some societies arrange for garden competitions, farmstead competitions, competitions in drilling, summer fallow competitions, and others of a similar nature, all of which foster better farming methods.

Some such contests as are named above were put on by about twenty agricultural societies this year. More had been planned, but, owing to the failure of the crops in some sections, due to the continued drought, some had to be cancelled. The judging had to be done unusually early this year owing to the exceptionally early ripening of the crops.

The following information outlining the rules governing these contests was issued in circular form early in the year for the use of societies holding competitions.

For the summer of 1919 the conduct of standing crop competitions will be on a basis subject to a regulation of the Dominion Seed Commissioner which reads as follows:—

"The amount of the subventions shall not exceed \$50 for each kind of crop. Subventions will be paid on account of competitions conducted with five kinds of crops under the auspices of any one agricultural society. The crops may include cereal grains, grass, clover or other crops grown for seed. In the case of biennial crops as field root or garden vegetables, prizes shall be awarded on the combined scores of the growing stockling or root crop and the growing seed crop produced therefrom."

For the guidance of those conducting the competitions in Saskatchewan, the following rules are provided by the Director of Agricultural Extension:—

1. The fields of cereal crops shall be at least ten acres; the fields of grass at least five acres; alfalfa, five acres for forage, one acre for seed; corn or roots for forage, one acre. A separate prize list shall be offered for each competition to be held under the society. Where the area of fields entered is over the minimum required, the whole field will be scored and prizes awarded accordingly.

2. Prizes to the amount of not less than \$50 shall be offered for cereal crops and \$25 for the others. There may be four or more prizes in each competition as may be decided by the society.

3. Fields entered for competition shall be situated in the district tributary to the head-

quarters of the society or association with which entry is made.

4. Unless the society or association decides otherwise, the whole of the plot entered for the competition shall consist of only one variety of grain.

5. Each competitor shall be allowed to make one entry only in each class.

6. The society or association shall decide the amount of entry fee to be paid to the secretary when making entry.

7. The awards will be made by judges supplied by the Extension Department, College of Agriculture, Saskatoon.

8. Entries shall be made on or before July 15, to the secretary of the society or association.

9. The secretary shall mail to S. E. Greenway, College of Agriculture, not later than July 18, a statement showing all entries

made, arranged in the most suitable driving order for the judge.

10. The first or any other prize need not be awarded unless in the opinion of the judge the exhibit is worthy.

It would appear desirable that as soon as possible, probably within three years, standing crop competitions should be confined to the encouragement of the production of registered seed. In view of the real educational value of the competitions as conducted in the past, the Director will recommend the payment of grants from provincial moneys for competitions in gardens and acre value competitions, on the old basis, but would urge societies to give some attention to better classification of these activities, by adding classes for seed which is eligible for registration.

ALBERTA

BY JAS. D. SMITH, SUPERINTENDENT, SEED AND WEED BRANCH

BECAUSE of the drouth in the southern and eastern parts of Alberta only a comparatively small number of field crop competitions were held this year but the competitions held were very satisfactory both in point of number of entries and the very superior quality of same. In all about 250 fields were entered and with very few exceptions, all were of splendid quality—many fields of wheat showing a probable yield of from 35 to 45

bushels per acre and oats from 80 to 100 bushels. Judges were supplied by the provincial department of agriculture and the results were highly satisfactory and encouraging both to exhibitors and to the Department, and it is hoped that this feature of competitive work among the farmers will be much more generally taken advantage of in the coming year. In this competition seven societies competed with entries ranging from 28 to 43 for each society.

QUEBEC

PLOUGHING MATCHES

BY L. P. ROY, B.S.A., CEREALIST

WITH a view to encourage the farmers to pay more attention to the tillage of the soil and in order to bring out more clearly the importance of good ploughing, special attention is being given this year as in the past, by the Quebec Department of Agriculture, to those farmers who desire to hold ploughing matches in their district. These ploughing matches are generally held by agricultural associations and farmers' clubs, except in such localities where the farmers have organized into a special association known under the name of "Ploughmen's Association." Each of these associations or farmers' clubs may provide, out of the grant which it receives

from the government or out of its own funds, a certain sum of money for the arranging of such competitions and for prizes. The programme and the rules of ploughing matches are prepared by the board of directors of each organization. These programmes differ widely. For instance, there may be associations which, instead of setting aside a special day for the competitors to meet and perform a piece of ploughing, include in the match all the ploughing done in the fall on the farm of the competing farmers. Other associations again, get the ploughmen together and make of this competition an agricultural demonstration, where

special classes are provided for various types of ploughing, teams of horses, and gasoline tractors, etc.

The following scale of points is handed to the judges by the Department of Agriculture:—

SCALE OF 100 POINTS

Names of competitors	Strike out	Number of furrows	Last furrow	Depth	Furrows well turned	Cut	Packing	Straight land	Level of land	Regularity	Draining furrow	General appearance	Score

We believe that such competitions afford a splendid means of hastening agricultural progress, by encouraging the farmer to till his soil better and to improve his methods generally.

As Caton, an ancient philosopher, said: "Good farming is: 1st, ploughing; 2nd, ploughing, and 3rd, manuring.

COW TESTING CAMPAIGN

THE provincial Department of Agriculture has issued a conspicuous hanger designed to call the attention of dairy farmers to the importance of testing their cows for milk production. The circular points out that testing in this manner is the only means of identifying the most profitable producers, enabling

them to eliminate the unprofitable animals. The circular points out that the average production of milk in Quebec is about 3,500 pounds per year and points out that it should not be less than 7,500 pounds. These hangers are being exposed in all of the cheese factories and creameries of the province.

DEMONSTRATIONS IN CORN GROWING

BY N. SAVOIE, SECRETARY, QUÉBEC DEPARTMENT OF AGRICULTURE

UNDER the provisions of The Agricultural Instruction Act there has been allotted to this department from year to year a sum of money to carry on corn growing demonstrations. This sum is used to demonstrate proper methods of growing corn in parts of the country where this crop can be grown satisfactorily. The plots or fields in which the demonstrations are made are placed under the supervision of agricultural representatives; the size of the plots vary from half an acre, when only corn is grown, to an acre when another hoed plant is also under test. The varieties chosen are those that are the most suitable for this climate, such as Longfellow, Quebec Yellow, Early Leaming. Seven demonstration fields have been estab-

lished this year to encourage this industry; three of these are for the growing of corn alone and four include the growing of corn and another plant. Each of these fields is visited twice yearly during the season by a special instructor from the department, in addition to the visits made by the agricultural representatives.

At harvest time, the exact yield is noted and the value of the crop is figured, in comparison with other crops for the feeding of milch cows. Through these demonstrations, the growing of corn has become more general in the districts where it is practicable. This policy will be carried on by the Minister of Agriculture, as long as it is judged to be necessary.

THE MAPLE SUGAR INDUSTRY

BY C. VAILLANCOURT, CHIEF OF THE MAPLES INDUSTRY

THE maple sugar industry has increased threefold in our province during the last three years, mainly owing to the scarcity of beet and cane sugar, and the continual rise in the price of this product.

But one factor which has stimulated perhaps more than anything else the development of our sugar industry, is the sugar-making school. A number of sugar schools were established at various places by the Department of Agriculture and many demonstrations in sugar-making were given in all parts of the province by special instructors sent here and there, at the expense of the Department.

There are three sugar schools in the province: one at La Minerve, Labelle county, another at Beauceville, Beauce county, and the third at Ste. Louise, L'Islet county.

Modern methods of sugar and syrup making are taught in these schools. Young men who desire to learn sugar-making or to perfect themselves in this industry have only to apply to the Minister of Agriculture, and on receipt of a letter of authorization, they may spend eight, ten or fifteen days at one or other of these three schools and get very practical lessons on the modern methods of making maple products.

The Department pays the board of these students during their attendance at the sugar school.

The following is a summary of the work done at each of these schools.

At La Minerve sugar-school 371 gallons of syrup were manufactured; the number of maples tapped was 3,500. The sugar season lasted from the 24th of March to the 27th of April; four pupils followed the course.

At the Beauceville sugar school, the first maples were tapped March 19 and the season ended on the 24th April. There were 14,230 gallons of sap collected and 3,565 pounds of sugar manufactured; 328 visitors

saw the extent to which the methods of sugar-making have been improved during the last few years, in enabling the makers to obtain a choice product. There were twenty-seven pupils attending the demonstration during the larger part of the season. The number of maples tapped was 3,500.

At the Ste. Louise sugar school, over 5,000 maples were tapped. The first run of sap took place March 25th and the last collection of sap was made on April 27th, 26,194 gallons of sap being collected during the season which were converted into 210 pounds of sugar, 537 gallons of syrup and 100 pounds of "taffy" (tire). This well-equipped and well-managed school was visited by 458 persons; two pupils took the course.

Of course, in all these sugar schools modern evaporators and implements are used. Everything is kept in the greatest condition of cleanliness from the tank in which the sap is gathered to the can in which the syrup is put. The pans are washed every morning. Cleanliness is, of course, one of the most important essentials in the making of choice products.

Five instructors in sugar-making gave demonstrations throughout the province on the use of modern methods of sugar-making. The total number of demonstrations given was ninety-four in eighteen counties of the province.

At a certain date, which is arranged beforehand, the sugar-makers are called by the instructors in one of the sugar groves of the province. The instructor makes sugar himself, by using material which he brings with him. Then the makers may ask all the information they desire to have. Such demonstrations have been very successful wherever they have been held. It is assuredly the most practical way to teach the good methods of sugar-making.

Such demonstrations have been going on during the last four years

and the results of this practical method of teaching are already seen, as this year the purchasers say that about seventy-five per cent of the sugar manufactured was first quality.

Of course, there remains improvements to be done but we are happy to record the splendid results of the work already done and which augur well for the future.

The total crop of sugar in the province was not quite as large as that of 1918. In some districts, there was more sap than last year; in others the quantity collected was hardly one-quarter of that of the previous season. In the Eastern Townships and in the Quebec district, the season was very good and

the sap of better quality than last year. On the other hand, in the counties of Portneuf, Champlain and the Three Rivers district the crop was very much below that of other years.

The exact figures are not known as yet, but the quantity of maple sugar manufactures in our province this year probably amounts to 30,000,000 pounds.

If these 30,000,000 pounds are valued at 25 cents a pound, which is far from being an exaggeration, this makes a total of \$7,500,000. The crop of 1911 had been about 10,000,000 pounds. As may be seen by these figures, the industry has developed on a very large scale during the last few years.

MACDONALD COLLEGE ALUMNI REUNION

BY R. SUMMERBY, B.S.A., PROFESSOR OF CEREAL HUSBANDRY, MACDONALD COLLEGE, QUE.

WHEN the first graduates in agriculture from Macdonald College received their degree in 1911, they formed an Alumni Association. The purposes of this was to keep all graduates organized as a body so that they might be of most value to one another, to their alma mater and to agriculture generally. Since then each year a graduating class has been added to the ranks of the association and there are now one hundred and twenty-eight members.

The executive organization consists of a general secretary who resides at Ste. Anne's, and a class secretary for each of the classes. Each class secretary is responsible for the members of his class and co-operates with the general secretary in seeking to attain the objects of the association as a whole.

Reunions are held every five years but on account of the war the first one, which was to be held in 1915, was postponed until August, 1919, which seemed to the executive to be the most suitable time. Most men had returned from overseas, and many were free to attend that could not

do so in 1920. Moreover, it was felt that a reunion at this time would give the returning men a splendid opportunity of getting in touch with their fellow graduates, and with conditions prevailing in different parts of the country.

The programme consisted of social functions, including a dance, a picnic, a luncheon, and a banquet; an organized trip around the college departments, and several business meetings. The reunion lasted four days and was attended by fifty-six members.

The social gatherings afforded a splendid opportunity of meeting many old acquaintances and making new associations. They also provided a splendid meeting ground for the discussion of many important problems confronting agricultural graduates. At the luncheon Dr. J. W. Robertson spoke on his work since leaving Macdonald, and touched on the outlook of agricultural graduates. President Klinck of the University of British Columbia spoke at the banquet on the New Era and its Relation to Agriculture.

At the business meeting much

discussion took place relative to important problems confronting agricultural workers. Several resolutions were passed including one relative to the re-organization and co-ordination of forces in the various fields of agricultural endeavour. A committee was appointed to take the initiate steps towards the formation

of an Association of Agricultural Graduates in Canada.

The association decided to erect a brass tablet in memory of the graduates who fell in active service. To further commemorate the part that the graduates took in war, a memorial fellowship fund was established.

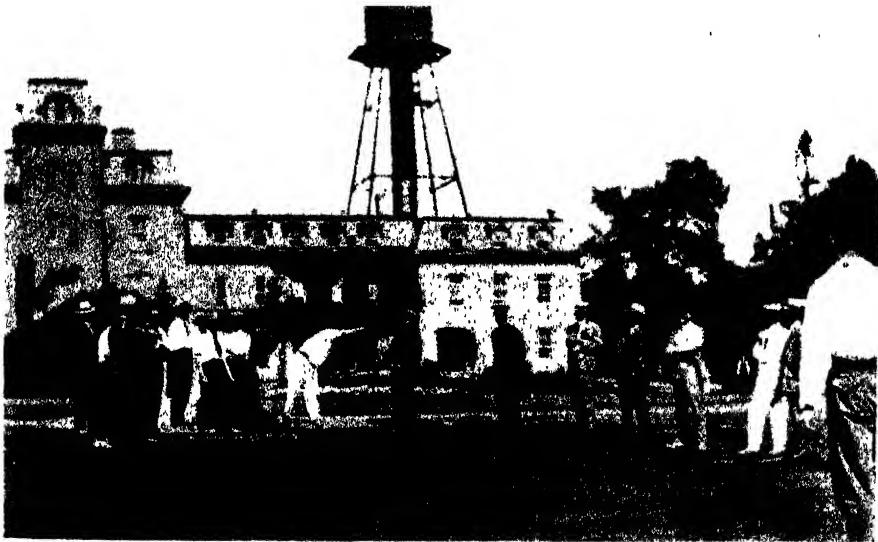
ONTARIO

SUMMER SCHOOLS FOR TEACHERS

BY J. B. DANDENO, PH.D., INSPECTOR OF ELEMENTARY AGRICULTURAL CLASSES

THE attendance at the Summer Courses in Agriculture for Teachers, in 1919, was the largest on record. From the indications in 1918, it was expected that there would be a considerable in-

Ladies' College, Whitby, with its ample dormitories and dining halls, in addition to farm and garden, offered a suitable place for such a course. An arrangement was therefore made between the Department of Educa-



SPORTS DAY O.A.C. SUMMER COURSE, 1919
PUTTING THE SHOT. NOTE THE POSITION OF THE SHOT DIRECTLY ABOVE THE HEAD
OF THE MAN JUST DELIVERING IT

crease in the year following, consequently, in view of the fact that the Ontario Agricultural College had reached the limits of its accommodation, an effort was made by the Department of Education to see if another centre or other centres could be secured to accommodate the overflow from Guelph. The Ontario

tion and the Governor of the Ontario Ladies' College by which the overflow from the Ontario Agricultural College could be taken there in 1919. This has been carried out with gratifying success, and a similar arrangement is likely to be made in 1920.

During the summer session of 1918 and 1919 the Public and Separate

School Inspectors were invited by the Minister of Education to take the course leading to an intermediate certificate in agriculture, in view of the fact that they would be required to inspect the agricultural classes in their inspectorates, and also to encourage and assist teachers in their efforts to introduce and carry on the work especially in the rural schools.

Nearly all the Inspectors of the Public and Separate Schools have completed the course referred to and will be granted full intermediate certificates in agriculture.

The attendance since 1911 is given in the following table, that in 1918 and 1919 being especially large on account of the attendance of inspectors:—

ATTENDANCE AT THE ONTARIO AGRICULTURAL COLLEGE, SUMMER COURSES IN AGRICULTURE, 1911-1919.

(One class was given at Whitby in 1919.)

Year	Elementary.					Intermediate				Inspectors			Farm Mechanics	Total.
	I		II			I		II		III	I	II		
	O A C.		Whitby	Men	Women	Men	Women	Men	Women	Men				
	Men	Women	Women											
1911	8	75		1	16								100	
1912	16	65		2	23								106	
1913	14	64		5	36	23	4						146	
1914	8	55		5	27	13	4	14					126	
1915	15	39		5	18	17	1	9					105	
1916	11	99		9	31	15	3	14	1				183	
1917	15	138		7	81	9	1	13	2				276	
1918	6	187		7	119	20	11	9		9	79	9	456	
1919	16	155	70	6	160	9	19	7	21	0	86	10	550	



SPORTS DAY, O.A.C. SUMMER COURSE, 1919
TEACHERS PLAYING CAPTAIN BALL

A glance at the above table will show that, since 1915, a marked progress has been made with respect to the attendance, even after the number of those taking the Inspectors' course has been subtracted.

A considerable number of those who enter Part I of the course leading to an elementary certificate, for some reason or other do not complete the course by taking Part II. The following shows the percentage of shrinkage:

Number taking Part I.		Number completing Part II the following year		Decrease per cent.
1911	83	1912	24	71
1912	81	1913	41	50
1913	76	1914	32	58
1914	63	1915	23	64
1915	54	1916	40	26
1916	100	1917	88	12
1917	158	1918	126	20
1918	193	1919	166	14

These figures show a very marked improvement in 1916 to 1919, with respect to the dropping out referred to.

On account of the large number in attendance, dormitory or boarding accommodation could not be provided for the men, consequently, the courses



THIRTY-SEVEN SISTERS OF VARIOUS ORDERS ATTENDED THE TEACHERS' COURSE AT O. A. C. IN 1919

An interesting feature of the summer course in 1919 was the presence of thirty-seven "Sisters," teachers from R.C. Separate Schools. Though handicapped somewhat in the garden work, by their method of dress, they accomplished manfully all the regular work, in class, laboratory, and garden, with praiseworthy success.

for all concerned lost much of their charm and something of their efficiency. Going back and forth down town consumed much time, and in most cases this prevented attendance upon evening meetings.

As was the case last year, the swimming tank provided an opportunity to learn to swim, and also a

means of enjoyment to those who had previously learned.

Special lectures were given as follows: An address of welcome by President Creelman on "The Functions of the College"; by Professor Harcourt on "The Essentials in Human Food"; by Professor Crow on "Birds" and by the Honourable Dr. Cody, Minister of Education, on

"The Educational Outlook." Quite naturally all of these addresses were highly appreciated.

The Minister of Education spent a day visiting the classes at work in garden and laboratory, realizing that the way to get first hand information with respect to the work being carried on is to see for himself the students at work.

COMMUNITY HALLS

IT is well recognized that social as well as economic conditions have much to do with community development and well being. While in many rural sections a very desirable condition, socially, exists there has been recognized for some time the need of proper meeting places or of desirable centres for community

of *The Agricultural Gazette*, was introduced by the Minister of Agriculture, who considered it a proper movement to encourage. This Act provides for financial assistance to rural communities for the purpose of erecting community halls or for providing such accommodations in consolidated schools.

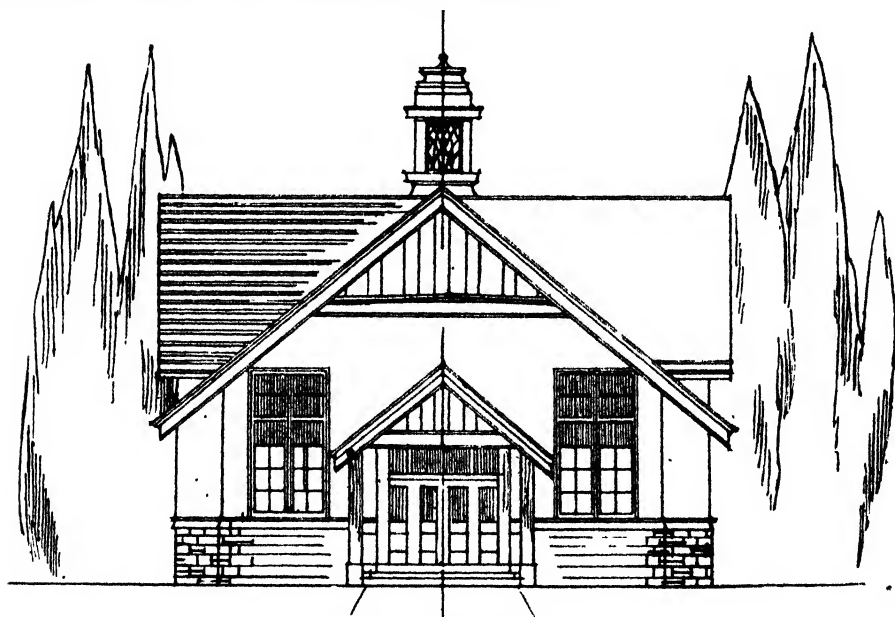


FIG. 1. Front Elevation.

gatherings and for organized community effort. Having these facts in mind the Ontario legislature, at its last session, passed the Act respecting the establishment of community halls and athletic fields in rural districts. This measure, which was briefly reviewed in the June number

In order to safe-guard against the possibility of these halls being unsuitable for the purposes intended a number of regulations under this Act are provided. These regulations were stated in full in the September number of *The Agricultural Gazette*. One of these requests that the hall

shall include an auditorium with moveable seats, reading room, library, and kitchenette. The auditorium should have a level floor and platform with space suitable for recitals, dramatic entertainments, and the discussion of public questions. It is intended that such a building shall be available for all meetings and gatherings of a community nature in the broadest sense of the meaning

ings, together with brief specifications, are given. One of these plans is reproduced herewith. It is the intention that these plans should serve as a guide and may be modified to suit local conditions. All plans of proposed community halls and athletic fields must be submitted for the approval of the Department of Agriculture and on the approval of the Department blue prints will be

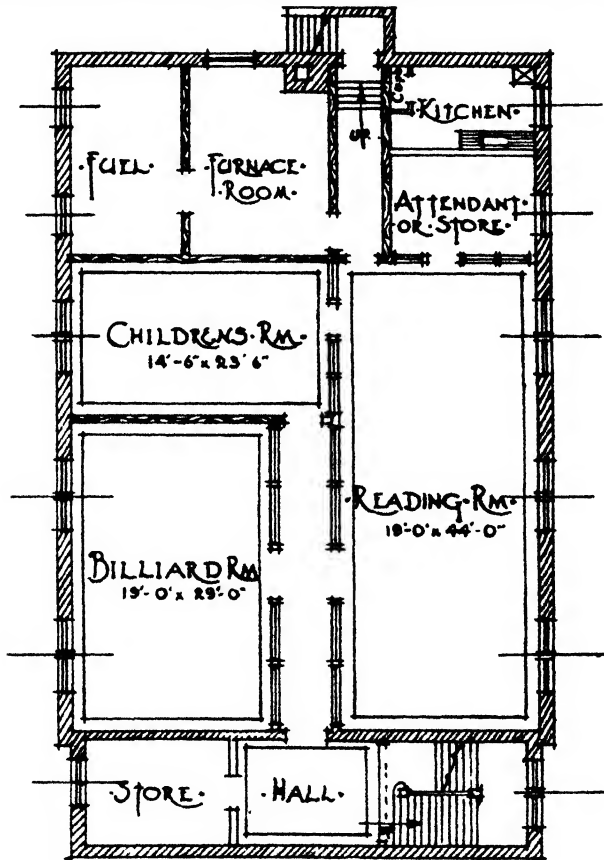


FIG. 2. Basement Plan.

of these terms, and consistent with the regulations made under the Act. Also it is provided that each community hall shall have in connection with it at least three acres of land adjoining the building or in close proximity to it. This land is to be used for sports, picnics, and outdoor gatherings. In Bulletin 273 of the Ontario Department of Agriculture plans of four different types of build-

ings prepared for departmental filing purposes and for the use of the board of management.

A board of management, which constructs a new building or remodels the building now in existence according to plans provided by the Department, and provides the required athletic field, shall receive from the municipal corporation of the township the government grant of twenty-

five per cent of the cost of the building exclusive of the cost of the land for but no grant shall exceed \$2,000. the building and grounds.
The cost of the building shall be

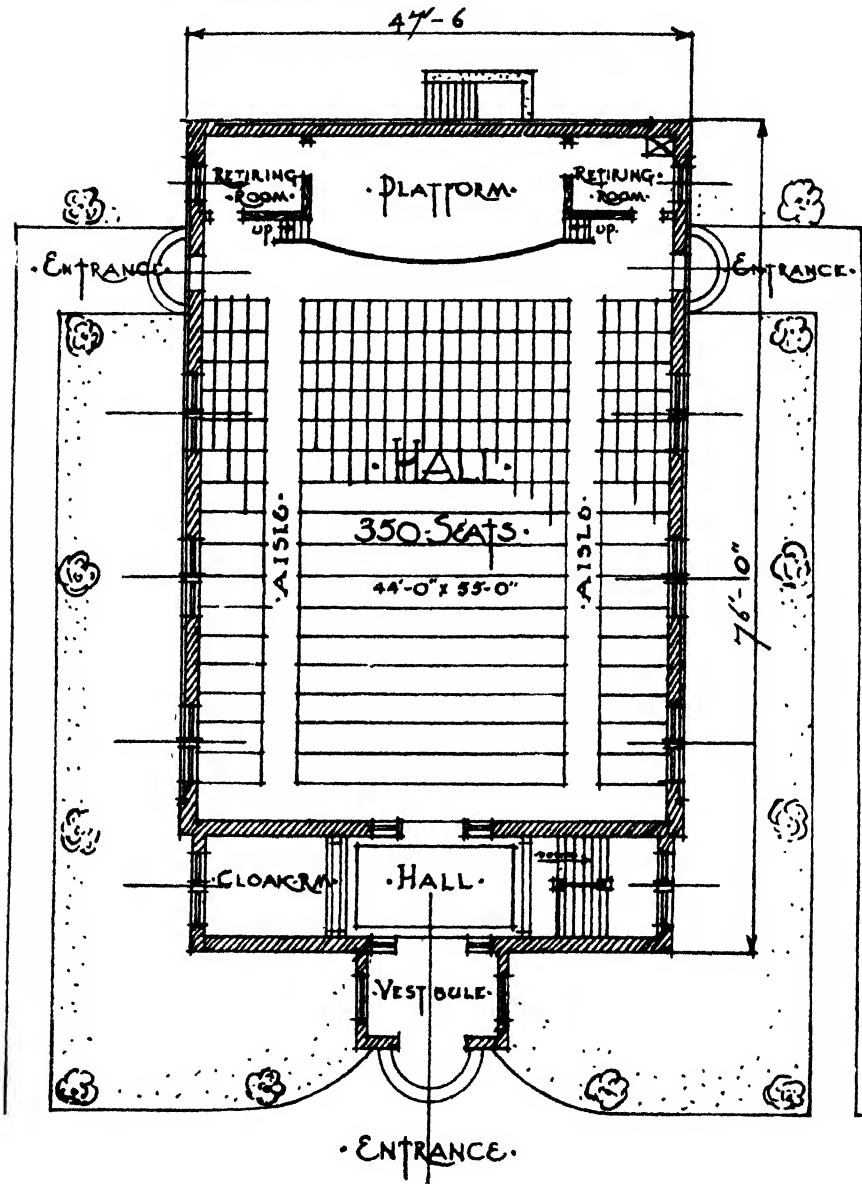


FIG. 3. Ground Floor Plan.

AMONG THE AGRICULTURAL REPRESENTATIVES

IN several counties in Ontario the vegetable growers' have held field days. The gatherings at each place have been addressed by prominent seed growers' and agricultural officials, among whom were Dr. R. E. Stone, Mr. W. A. Ross, Mr. A. H. McLennan, and Mr. Charles Wilson, who spoke in the counties of Lambton, Lincoln, and Middlesex.

Through the efforts of W. P. McDonald, the agricultural representative for Lambton County, and his assistant, W. H. Sproule, the Lambton Creamery Company have greatly improved the grade of butter produced in their factory. Mr. Sproule, who is a competent dairyman, especially experienced in factory work, has been assisting the creamery with the pasteurization during sparetime this summer, with the result that this company, which had a daily output of 6,000 pounds in June, has decreased the loss of butter fat from the butter milk to one-tenth of one per cent, which means a daily saving of from \$75 to \$100. The representative and his assistant made moisture, salt, and butter fat tests and instructed the creamery men in the fundamentals

of factory dairying, showing the reason and underlying principles involved, with a very satisfactory result for the creamery.

In Huron County an experiment with sunflower silage will be carried on this year and the representative, S. B. Stothers, will keep close watch over the progress and outcome of the attempt.

In Grenville County the local women's institute has given \$25 to be distributed in prizes for front and back lawns. The interest shown by the people of the village of Kemptville resulted in a marked improvement in many lawns of the village.

The agricultural representative for Lanark County, in co-operation with Mr. McCrostie of the Dominion Live Stock Branch, is trying to get under way a Central Live Stock Association for the county with the idea of having a large candling centre where eggs can be candled and supplied to retail merchants and others. An application has been drawn up and sent to the provincial treasurer for a charter. The association is to be known as the Lanark Co-operative Limited.

MANITOBA

RURAL COMMUNITY DEVELOPMENT

BY WM. R. WOOD, SECRETARY, MANITOBA GRAIN GROWERS' ASSOCIATION

SINCE the very inception of the organized farmers' movement in western Canada the fundamental fact has been recognized that the rural community unorganized will be ineffective and easily victimized by exploiters and predatory interests, and that if a community is to be strong enough to defend itself from such exploitation, it will be through the development of its own life socially, intellectually, and also economically and politically.

Hence the movement has been essentially a "community life" movement. The ideal of the local grain growers' association is that it should be the community club of the rural community, unifying the thought and the interests of the country neighbourhood and providing for social intercourse, civic and economic study, and the development of the powers of the individual for community service and for effective citizenship in the nation.

So far is the Grain Growers' Association from being a class institution standing in antagonism to other classes, or a dollar-grabbing organization, seeking selfishly to get the most out of those with whom it transacts business, it places in the very forefront of those objects, for which it invites its members to labour the following:—

(a) The all-round development of rural life with a view to making it as satisfying and as effective in the commonwealth as possible, and the establishment of right relationships between rural and urban communities.

(b) To forward in every honourable and legitimate way the interests of the rural population, not in antagonism to other elements of our population, but in cordial co-operation with all.

(c) To establish libraries, literary societies, reading rooms, to arrange for lectures, and to further extend knowledge along economic and social lines, with a view to elevating the standard of living in rural communities.

(d) To give careful attention to the development and training of leaders in rural life, and generally to educate and stimulate the populace to fuller exercise of the powers of citizenship.

(e) To promote independent personal thinking upon the questions of the time, to create public spirit and to quicken the public conscience in regard to evils that persist in our present life in order that so far as possible they may be abolished.

(f) To watch legislation relating to the farmers' interests, particularly that affecting the marketing, grading and transportation of their grain, livestock, and other products. To suggest to Parliament from time to time through duly appointed delegates as it may be found necessary, revision of existent laws or the passing of new legislation to meet changing conditions and requirements.

(g) To promote the securing by local country and village communities of suitable halls or meeting places and the equipment and furnishing of such as social and community centres.

(h) To foster and encourage the co-operative method of distribution of farm products and supplying staple commodities.

(i) Making more adequate the educational facilities of the rural boys and girls, and the securing of more intimate relationship between the school and the other units which make up the community.

Nor is it the case as might be suspected that these high ideals were formulated by some enthusiastic pioneer of the movement and in actual practice largely allowed to lie

unattempted. It may be said with the fullest assurance that these ideals never were more widely accepted than they are at the present moment, and in the activities of the last five years the emphasis laid upon these aims is attracting the best young manhood and the best of rural womanhood to their support.

Recently when the newly organized Women's Section of the association formulated its aims and projects they were expressed as follows:—

(1) To extend the influence and increase the power of the association by special effort to enlist the support and sympathetic co-operation of the women and girls of our rural communities.

(2) Assisting the association in providing training for leadership for the young people of the rural communities.

(3) The enrichment of rural life socially and intellectually by study, discussion, social intercourse, and wholesome, well balanced recreation.

(4) Education of women and girls for the responsibilities of community life and of democratic citizenship generally.

(5) Making more adequate the educational facilities of the rural boys and girls, and the securing of more intimate relationship between the school and the other units which make up the community.

(6) The safeguarding of the fundamental rights of women and children by more adequate and just legislation, both Dominion and Provincial.

(7) Better provision for the safeguarding of public health especially of children, and the securing of more adequate medical and hospital facilities for rural districts.

(8) The maintenance and defence of the home as an institution.

(9) Co-operation where possible with all organized forces, spiritual or material, which are working for the greatest good of the country and its people.

(10) Larger emphasis upon the finer things of life—"the things that are more excellent."

At a recent convention the following unique pledge was adopted by a unanimous vote, and is being widely regarded as a concise expression of what the local association should be attempting:—

"Since the strength of the nation lies very largely in the character of its citizens, in the integrity and happiness of its homes, and in the

social and economic efficiency of its local communities. And since the course of our development as an organization has opened to us doors of unique opportunity for influencing and moulding rural life,

"We, the Grain Growers' Association of the Province of Manitoba, accept loyally the moral obligation with which such conditions confront us, that we should set ourselves with purposeful endeavor to the development and expansion of the life amid which we move, in order that the people who live and labour on the land may take a larger and worthier place in the life of the nation. And to this end we urge the officers of every local branch to take counsel among themselves and with their membership as to how best they may-

"1st. Unify and inspire the local community for its fullest self consciousness and its most efficient activity.

"2nd. Enlist the sympathetic co-operation of all the best elements, the finest moral spirit, the best trained intellect in the community for the cause.

"3rd. Promote the education of the people, and especially the youth, in the principles and the spirit of democratic citizenship.

"4th. Encourage the development of effective community workers and leaders."

But it may be asked, what is being actually accomplished along the lines of these ideals? In answer to that, while it is recognized that very much remains to be done, it is not too much to say that in many districts a real community consciousness has been created and people have been led to come together and to think practically about their common interests. Here and there through the province individuals, having been drawn into the service of the local

association, have by that service been trained into effective community-servants, and as the years pass an ever larger number are seeing the possibilities of service and are taking up in earnest the study of our economic and social principles.

In many districts the local association has interested itself in the development of lecture courses, systematic study of economics, the inauguration of rural libraries, the promotion of debates, and kindred services. In fact wherever our local associations are really active they are coming to consider themselves as a permanent public welfare committee inside of whose sphere comes every activity that can be made to serve the cause of social and general betterment.

Perhaps the greatest achievement -- and it is readily admitted that this also is only very partially realized -- is the training that has been given to thousands along the line of civic consciousness, the creation of a body of independent thinkers throughout the province who are able to largely lay aside the handicap of party prejudice and to view issues and policies impartially. Unprejudiced judgment upon public questions, especially if it be found in conjunction with conscientious desire to do one's full duty as a citizen, is surely one of the greatest benefits that can be conferred upon any people. Just in proportion as a people acquire this personal independence of judgment it may confidently be asserted they are moving in the direction of a vitalized and effective democracy. This ideal we hope is being practically furthered by the farmers' organizations of western Canada.

LOANS FOR FEED PURCHASE

BY J. H. EVANS, DEPUTY MINISTER OF AGRICULTURE

TO assist the farmers in a number of municipalities in south-western Manitoba whose farms were dried out this year, the

provincial government has made provision for loans more especially for the purchase of feed for stock. The order-in-council covering the

relief, provides that each of the stricken municipalities shall receive money up to thirty thousand dollars for the purchase of feed. This money will be loaned to the farmers by the municipalities at the lowest possible rate of interest, to be determined by the amount which the province pays when the government raises the money.

The government also pledges in the same order-in-council to introduce legislation empowering municipalities to borrow, next year, limited sums of

money to supply seed grain. As a preliminary step to know definitely what their needs are an individual farm survey has been made in this district this autumn.

The money will be loaned to the farmers according to the amount of land that they are farming. A farmer with 320 acres will be eligible for a maximum loan of \$600, and a farmer with one section or more, \$1,000. The government and the municipality will bear any loss that may be entailed, in equal portions.

FRUIT GROWING AT THE AGRICULTURAL COLLEGE

BY PROFESSOR F. W. BRODRICK, HORTICULTURAL AND FORESTRY DEPTS. MANITOBA AGRICULTURAL COLLEGE

FROM a fruit growing standpoint, the present season has been a particularly favourable one in Manitoba. Practically all classes of fruit, including wild fruits, have borne very heavily. The yield in the College orchards has been very satisfactory and has served to demonstrate very clearly the fruit growing possibilities of the province.

Strawberries have been an especially good crop. The June bearing varieties have yielded fairly well, but the ever-bearing varieties have yielded very large crops of berries of excellent quality. The long bearing season of this latter class renders them particularly well suited for Manitoba gardens. Of the June bearing varieties the Bederwood and the Dakota are satisfactory. In the everbearing varieties only the Progressive has been grown at the College. The 1017, a variety originated in Minnesota, and the Americus are also good.

Currants, both red and black, have yielded well. The currant can be grown practically anywhere in Manitoba. The greatest drawback being

the injury done to the leaves by the ravages of the Currant Saw Fly. The Red Dutch and Fay's Prolific are hardy and profitable varieties.

The crop of red raspberries has been good and the fruit of good quality. Abundance of rain during the harvesting season tended to increase the yield and maintain the quality of the fruit. The Sunbeam has proven to be a very hardy variety and produces a berry of good quality.

The yield of native plums was particularly heavy and the fruit of good quality. Growing on the College grounds are a number of selected native seedling plum trees. These trees were in full bearing this year, and their crop has demonstrated very clearly that plums of good size and quality can be grown in Manitoba. From 50 to 100 lbs. of fruit have been taken from each tree.

The yield of apples was also good, particularly the crab-apples and the Saunders hybrids. Many of these are not much larger than crab-apples, but are fruits of very fair quality.

THE STAGE OF MATURITY OF CUTTING WHEAT WHEN AFFECTED WITH BLACK STEM RUST

BY J. H. ELLIS, FIELD HUSBANDRY DEPT., MANITOBA AGRICULTURAL COLLEGE

AMONG the experiments conducted this year by the Soil and Crop Management Department of the Manitoba Agricultural College, some interesting results were secured regarding the effect on the weight and quality of wheat when cut at various stages. The results are not in accord with the popular idea that when wheat is attacked by rust it is better to cut it on the green side, as it is generally assumed that the grain will lose weight if left until ripe before cutting it. The experiment indicates that the reverse is true, namely, that grain should not be cut at a stage before it would be harvested in the ordinary course of events if rust were absent, and that the maximum weight is secured in cutting when the grain cannot be crushed when pressed between the thumb and finger.

Two fields of badly rusted Marquis wheat were divided into seven plots each and cut at seven different stages of maturity, one block being a duplicate of the other. Cutting was commenced on the first plot when the grain was in the late milk stage, and each succeeding plot was cut three days later than the last except when unfavourable weather made it necessary to postpone cutting until the first day that it was fit to operate the binder.

Threshing of these plots has been completed and the results tabulated. The following general observations were also noted:—

Premature cutting resulted in:—

Brighter colour and lustre.

Many shrunken grains of a bright brick red colour.

Considerable numbers of green immature kernels.

Shrunken berries and decreased weight.

Cutting when the grain was firm resulted in:—(Grain was adjudged "firm" when it could not be crushed when subject to pressure between the thumb and finger).

The greatest weight per bushel.
The greatest yields.

Cutting delayed until the grain was dead ripe resulted in:—

Lack of lustre.

Bleaching of grain.

Slight loss of weight and slightly decreased yields due partially to shelling of the best grain, and partially to loss from drying.

The figures on this experiment are very striking in respect to the weight per bushel obtained at different dates of cutting. Grain cut in the "late milk" stage weighed 56 lbs. per bushel while grain cut in the "firm" stage weighed 59 lbs. per bushel

INSPECTION OF PURE BRED FLOCKS OF POULTRY

BY M. C. HERNER, PROFESSOR OF POULTRY HUSBANDRY, MANITOBA AGRICULTURAL COLLEGE

THERE is so much variation and such a big difference in the quality of pure bred or standard bred and the so-called pure bred flocks of poultry as found in this province, and also other provinces, that a system of grading or classifying them according to their quality would be well worth while. A visit to the poultry section of almost any of our agricultural fairs in the summer or fall is ample proof of this statement. The poultry as shown at many of the fairs shows a great lack of information as to what constitutes a pure bred chicken. The poultry as advertised in some of our agricultural papers is further evidence that some of our so called breeders of pure bred poultry require a good deal more information on their own particular breed than they now possess. To be sure many of them have high class stock, but there are also a good many who simply do not know one breed from another, nor yet know what constitutes purity of strain in their own breed. These are the things that are each season causing more harm to the pure bred poultry industry than anything else. Many beginners get their first setback as a result of these conditions. We do not mean to say that any of these breeders are intentionally dishonest regarding their breed, but on account of not knowing the difference between a good chicken and a poor one they have been breeding indiscriminately year after year with the result that their flocks have deteriorated to anything but a recognized pure bred breed. Stock or eggs for hatching from these flocks are not worth as much as those from flocks whose owners have followed out a systematic line of culling, selecting and breeding. The breeder who has spent time, money and work to maintain a high standard in his flock is entitled to more recognition than the breeder whose work has been carried on in a haphazard way.

If all breeders met on common ground in the show room we could easily arrive at a system of grading the flock as to quality at least, but since probably only about one-half of them exhibit, we simply have to adopt some other method of doing the work.

With the rapidly increasing demand for pure bred stock and eggs for hatching from pure bred stock it becomes necessary to know where the better class of stock is located and how one flock ranks with another in quality and also on the other points mentioned in the attached score card.

The score card is designed specially for appraising pure bred flocks of poultry as to (a) the general appearance of the flock (b) housing (c) yards or pens (d) general care of flock and (e) breed requirements.

This Score Card Form has been endorsed by the Manitoba Poultry Breeders' Association.

Name of Breeder _____

Address _____

Breed of Poultry _____

GENERAL APPEARANCE OF FLOCK, 50--	Possible Score	Actual Score
Type and constitution..	15	
Health and condition	12	
Size and development.	8	
Freedom from or disposition to disease	10	
Absence of abnormal or deformed birds. . .	5	
HOUSING OF FLOCK, 35--		
Size, type and location of house.....	5	
Light	5	
Dryness.....	4	
Ventilation ..	4	
Free from draughts ...	4	
Average floor space per bird.....	4	
Arrangement of Roosts--		
Nests.....		
Hoppers and troughs		
Drinking vessels.....		
Dust boxes.....	9	

YARDS OR PENS, 20—		
Layout of yards in relation to house	4	
Size in proportion to number of birds kept	4	
Method of fencing . . .	3	
State of repair	3	
Shade	3	
Green feed	3	
GENERAL CARE OF FLOCK, 45—		
Cleanliness re roosts, nests, litter, yards, feed and water	15	
System of feeding . . .	4	
Class of food fed . . .	3	
Keeping of records . . .	3	
A place for everything and everything in its place	10	
Precaution against disease	10	
BREED REQUIREMENTS, 50—		
Type	10	
Color	10	
Purity of strain . . .	10	
Quality and standard of strain as shown by winnings	20	
Total		200
Number of birds Old		
Young		
Judge Date 19		

The features mentioned are all very closely identified one with the other and they deal directly with the essential points that govern the value of any pure flock of poultry.

Pure bred birds might be ever so good from an exhibitor's standpoint and yet fall down as a flock from which eggs for hatching and breeding stock should be secured due to improper housing, lack of proper care, predisposition to disease, poor constitution or any of the other points mentioned.

The much discussed question of utility has been kept more or less in the back ground for various reasons. A score card of this kind,

if it is to serve the purpose for which it was intended, must place all pure bred flocks on the same basis and give fair values for the points that might be construed as utility points and those that plainly indicate a higher line of breeding and exhibition quality.

In so far as egg production is concerned this question cannot be taken up in a score card of this kind without first having laid a foundation for systematic inspection of egg yields from a flock as a whole and also the records of performance of individual birds in the flock. No competent judge or inspector would care to sign his name to any score card embodying in it the records of a flock, the accuracy or the correctness of which he could not vouch for, even though he was perfectly satisfied as to the honesty of the breeder. Eliminating this factor the keeping of records is given due consideration under the heading—"General Care of the Flock"—where the number of eggs laid or the returns for the same can be taken care of.

In regard to the control or eradication of disease this score card does not aim to do anything specific except in pure bred flocks only. The great majority of these flocks are relatively free from disease like tuberculosis for example. It is in the flocks of the vast number of poultry raisers who are keeping the nondescript or mongrel flock that there is the most tuberculosis and other poultry diseases, and these of course are not included in the inspection work for which this score card is intended.

To formulate a policy and adopt a definite system of inspection work for the control of tuberculosis in poultry will require a far more elaborate and rigid line of work than is possible in the inspection of pure bred flocks as outlined in this score card.

MANITOBA AGRICULTURAL COLLEGE

POULTRY NOTES—LIGHTED VS. UNLIGHTED PENS

TO determine the comparative costs of egg production during the winter of 1918-19 in lighted and unlighted pens, 12 lots of White Leghorns, each containing 25 birds, were used. In six of the pens no artificial light was used to give the hens a longer period daily for moving about and feeding. In the other six pens electric lights were switched on from 7 a.m. until daylight, and again from dusk until 10.30 p.m. Except for this difference all pens were handled in identically the same way, and the feed used was the same throughout. Accurate records of the food used and the number

of eggs gathered for the period from November 15th, 1918, to March 1919, give the following marked difference in cost of egg production.

	lighted	unlighted
No. of eggs laid	6,324	3,757
Cost of feed ..	\$111.30	\$105.60
Cost per egg ..	1.9c.	2.8c
Cost per doz. . .	21.1c	33.6c
Cost of light .	\$ 11.50	

From these results we may safely conclude that for heavy winter egg production, the use of electric light to supplement the period of daylight is of great value.

COMPETITIONS AND SHOWS

SOME of the agricultural activities carried on under the direction of the Manitoba Department of Agriculture are outlined below. These shows and competitions are encouraged because they tend to strengthen the interest of the agriculturists of the province in the best methods of production and bring about an interchange of ideas among farmers.

HORTICULTURAL SHOWS

Usually when the summer fair is held, vegetables and other garden produce have not matured sufficiently to make a good exhibit at the fair; consequently provision has been made for agricultural societies to hold horticultural shows at a later date. The government grant is on the same basis as for the agricultural fair; namely 60 per cent of the money paid out in cash prizes, the maximum being \$100.

At places where there are horticultural societies this work can with advantage be carried on in co-operation with that organization. Some agricultural societies even go so far as to

include the president or secretary of the horticultural society, or both, on their board of directors.

LIVE AND DRESSED POULTRY SHOWS

Live poultry shows are sometimes held at the same time as the Boys' and Girls' Club Fair (September 25 to October 12), but may be held at any other time. At least one-half of the prize money must be for utility breeds.

The government grant is 60 per cent of the amount paid out in cash prizes, the maximum being \$100, provided there are at least ten exhibitors.

Dressed poultry shows are usually held during the first three weeks in December.

Where a combined live and dressed poultry show is held, \$100 is the maximum grant, and a society which has held a live poultry show will not get another grant if, later on, they hold a dressed poultry show.

Expert judges are provided free of charge by the Extension Service.

To be entitled to the government grant, each society is required to have at least eight exhibitors and 15 exhibits.

SEED GRAIN FAIRS

The purpose of holding the seed grain fairs is to put the farmer who has good seed to sell in touch with the farmer who wishes to buy. As the seed fair is usually held in connection with the dressed poultry show, the most suitable time will be from December 1 to 20, so that the poultry can be marketed in time for the Christmas trade.

If a reasonable number of entries are received by the secretary, the Extension Service will provide two judges free. The judges will be on hand ready to commence work at 10 a.m. At 2.30 addresses are delivered by the judges and other prominent speakers on some phase of agriculture.

For the seed grain fair the government grant is 66 $\frac{2}{3}$ per cent of the cash prizes, \$100 being the maximum. Unless there are at least ten competitors at any seed grain fair, the government grant will not be paid. In reckoning membership grants, the seed grain fair and dressed poultry show will not be considered as two separate lines of agricultural society activity, even though they are held on separate dates.

PLOUGHING MATCHES

Good cultivation is dependent on good ploughing; yet possibly no other farming operation has received as little attention. There are hundreds of excellent farmers who are losing good horse-power because of wrong hitches or improper plough adjustments. It is almost impossible for a ploughman to win at a ploughing match unless both of these problems have received careful attention.

Critical observers who have had occasion to pass through the Portage la Prairie, Deloraine, Roland, Crystal City, Morden, Strathclair, Brandon, and other districts where ploughing matches have been held for a number of years have been quick to notice that the work done in these districts is superior to that done in other places. *

Ploughing is an art, but it is an art that can be acquired by any farmer who is willing to use his head as well as his muscles.

Ploughing matches have to be held during the last week in May or the first two weeks in June, as very few of the good farmers are willing to delay ploughing their summer-fallow beyond the middle of June.

A grant equal to 60 per cent of the amount actually paid out in cash prizes will be paid by the Department of Agriculture, the maximum grant being \$100 for from 8 to 10 competitors; \$200 for from 10 to 15 competitors; \$300 for from 15 to 20 competitors. A grant will not be paid unless there are at least 8 competitors.

The Agricultural Extension Service will provide one judge free for each ten competitors, provided the date chosen for the match is satisfactory.

SUMMER-FALLOW COMPETITIONS

Practically all Manitoba farmers summer-fallow a part of their land every year: (1) To conserve moisture; (2) to destroy weeds; (3) to make plant food available. Conditions vary in different parts of the province; consequently it is very necessary to ascertain the method of cultivation that will give best results in each district; and summer-fallow competitions are particularly well adapted for getting this information. Most men would cultivate their land equally well even though there were no competition; but the competition serves to centre the interest on the method of cultivation followed on the particular field entered in the contest.

As the summer-fallow competition is intended to serve as a demonstration on each man's own farm, it is recommended that not more than ten acres be entered in the competition. A field this size permits the judge to do better work, and also affords the farmer and his neighbours an opportunity of comparing the results obtained by following a certain method of cultivation with those obtained close by

where a different method is being followed. It is recommended that the competitions be arranged in groups of ten for convenience in judging.

The Department of Agriculture provides 60 per cent of the amount of money actually paid out in cash prizes, the maximum amount of the grant being \$100. Also the department furnishes a judge and pays his salary, travelling and hotel expenses; but the agricultural society is expected to provide a means whereby he can get to the different fields entered in the competition.

Three local judges should be appointed to go over the fields before harvest, and the regular judge should do his work after harvest, and the awards should be placed after taking both scores into consideration.

It is not possible to devise a score card that will meet conditions in all parts of Manitoba; consequently the two given here are in the nature of suggestions, and the "Summer-fallow Committee" of the local society should simply use one of them as a basis for making out their own score card.

SASKATCHEWAN

FARM LOANS

BY W. A. MACLEOD, EDITOR OF PUBLICATIONS

FARMERS of Saskatchewan located in all parts of the province have been loaned \$2,500,000 by the Saskatchewan Farm Loans Board since it started operations in the summer of 1917. The amount loaned represents loans made to nearly 1,500 farmers, a large proportion of these in the newly settled districts in the province some distance from railways, where the majority of mortgage companies are reluctant to make loans.

Greater Production Farm Loan Bonds have furnished a considerable amount of the funds required to meet the applications for loans, but owing to financial restrictions, and particularly owing to the fact that the Greater Production Loan campaign which had just been launched in 1917 was almost immediately withdrawn so as not to interfere with the Victory Loan campaign that fall, it has been quite impossible to meet all the demands. In fact the first six months the Board was in operation over 3,000 applications were received which would have taken over \$6,000,000 to satisfy.

Although there has never been an active sale for Saskatchewan Farm

Loan Bonds, the demand for these has been steady and continually increasing. Up to the first of the year the total bonds issued have amounted to \$1,559,480, slightly over \$400,000 of which are treasury investments.

In the budget speech delivered by Hon. C. A. Dunning, provincial treasurer, last January, he explained the object of the Saskatchewan Farm Loan Bonds as follows:

"We desired to borrow from the people of Saskatchewan who had money to loan and lend it to the farmers of the province who desired to borrow on first mortgage. We felt by means of this scheme we could help the man who had money to lend by paying him a higher rate of interest than he could get otherwise and could help the man who wanted to borrow by lending it to him on longer and better terms and at a lower rate of interest than anyone else. The Farm Loans Board lends its money at 6½ per cent, and pays to the holders of the bonds 5 per cent, the 1½ per cent difference being allowed to cover the cost of operation."

The Farm Loans Board operated for six months during the year of 1917, but did not finish its first full year until December 31, 1918. Up to that date the board had actually loaned \$1,758,288.37. The total cost of administration since the formation of the board up to the first of this year, exclusive of refundable disbursements such as inspection fees and legal disbursements which are chargeable against the borrower, was approximately \$26,000.

Although administration expenses have been exceedingly low, the policy of the board has not been one which made for the utmost economy, as instead of making a few large loans in the old settled districts, which would be a great deal cheaper from the administrative point of view, the board has been mixing up its loans, taking some of the easy ones close to towns and railroads with harder loans to place many miles away from the nearest railway, where settlers were trying to get on their feet and could secure loans only through the Farm Loans Board.

In the same budget speech Mr. Dunning explained that the principal object of the government was to reduce the cost of the money to the farmer, not to do all the business. "We did not expect to do all the business" said Mr. Dunning, "but we did and do hope to exert an influence on the cost of mortgage money to the farmer, and we also hope to affect the terms and conditions upon which he secures mortgage loans.

"There is ample evidence that we are affecting these conditions. Through our Farm Loans Board we have affected the attitude of the mortgage companies generally towards farm loans. While the cost of nearly everything in this province has gone up from one hundred to two hundred per cent since the war started, the cost of farm loans has inclined downward rather than upward."

At the time that legislation was brought down creating the board, the

fear was expressed that the farmers who were borrowing from the board would not pay their debts promptly, that the borrower would work on the principle that because the money was owing to the government, although obtained through the board, he did not need to repay promptly. Mr. Dunning, who has been prominently identified with the farmers' organizations in the province, was at great pains to impress on these organizations that the success of the scheme and its continuance depended on the business-like dealings on the part of the borrower with the board.

The expectations of the provincial treasurer have been more than realized. At the end of the first six months' operation only a comparatively small number of loans had payments coming due. Every one of them made payments in full. On December 31, 1918, with a very large number of payments having come due two months before, four-fifths of the amounts due on November 1 had been paid, in spite of the very bad year from an agricultural standpoint in portions of the province. On December 31 the amount of overdue principal was only \$3,593.

The money is loaned for thirty years on the amortization plan. In Saskatchewan the loan is a straight loan direct from the government through the medium of the Farm Loans Board, and the full amount of the loan, less the expense of getting the loan through, goes to the borrower direct, without passing through any association or company. On a loan of \$1,000 the annual payment of principal and interest is \$76.58.

The Saskatchewan Farm Loans Debentures are in denominations of \$20, \$100, \$500 and \$1,000, payable in ten years, and bear interest at 5 per cent payable every six months.

The members of the Saskatchewan Farm Loan Board are J. O. Hettle of Saskatoon, J. H. Grayson of Moosejaw, and Colin Fraser of Regina, Commissioner.

LIVE STOCK DISTRIBUTION

SOME interesting returns of the working of the Live Stock Products and Sale Act showing the net results of the efforts of the government to introduce pure bred and high class grade stock into Saskatchewan have recently been completed by the Live Stock Branch of the Department of Agriculture for Saskatchewan.

While the totals under the different classes of stock show a very satisfactory increase, which has been well maintained from year to year since the inception of this policy yet in the year 1918 there was a heavy

decrease in the number of pure bred bulls supplied and there was also a big decrease in the number of Holstein grade cows and heifers. This was entirely due to the high prices which these animals now command and the increasing difficulty in securing them. It is gratifying to note, however, that under the Live Stock Products and Sale Act 17,261 animals have been supplied which were secured by 2,067 farmers. The following table shows the complete record of animals supplied by the Department since 1913 when the act first came into operation:

	Pure bulls	Pure cows	Grade cows and heifers	Pure rams	Grade ewes	Swine	Total animals
1913	19	18	345	.	1,000		1,382
1914	41	14	483	13	482	2	1,035
1915	84	12	368	35	2,120	3	2,622
1916	150	6	342	10	852		1,360
1917	158	10	1,322	33	2,968	283	4,774
1918	135	7	1,725	127	4,061	33	6,088
	587	67	4,585	218	11,483	321	17,261

The number of farmers who have taken advantage of the assistance offered in the purchase and sale of

live stock under this act during the past six years is as follows:

	1913	1914	1915	1916	1917	1918	Total
Purchasers of cattle	127	163	184	243	356	310	1,383
Purchasers of sheep	..	18	52	30	101	162	363
Purchasers of swine	.	2	3	.	283	33	321
	127	183	239	273	740	505	2,067

IMPROVING LIVE STOCK

BY J. G. ROBERTSON, LIVE STOCK COMMISSIONER

IN order to more fully acquaint the farmers of the province with the facilities for acquiring cattle or improving their herds which are available for them under The Live Stock Purchase and Sale Act, the live stock branch of the Saskatchewan Department of Agriculture arranged this year to send to a number of fairs and exhibitions at various points in the province an exhibit of cattle, so that the farmers might see a representative sample of the class of stock offered.

The exhibit usually consisted of two parts, one being pure bred bulls and the other western bred heifers. The carload of bulls were good Saskatchewan pure bred animals, bought from Saskatchewan breeders and sold, either on a cash or credit basis, without profit, for the benefit of small breeders and stock raisers who wished to secure pure bred sires for their herds. The breeds represented were Shorthorns, Herefords, Aberdeen-Angus, and Holstein. The other part of the exhibit consisted of a number of western bred, good type, grade heifers, which were sold at practically beef prices.

The bulls were shown at Saskatoon, Lloydminster, North Battleford, Prince Albert, Yorkton, Regina, and Swift Current, and the heifers at all these points except Saskatoon and Swift Current. At each exhibition an expert from the live stock branch was in attendance, whose time was fully occupied in making sales and in explaining to the farmers the various credit options under which the cattle might be secured. As a rule when sold on a credit basis, the farmers paid one quarter cash and the balance was spread over two years at six per cent interest.

The policy achieved a good deal of success. Although of course none of the animals competed for any of the prizes, the exhibition managers welcomed the exhibit as an extra attraction to their fairs, and this demonstration of the work which the Department of Agriculture is doing drew considerable attention in view of the fact that the cattle were of a creditable, high class type, and being sold without profit, the prices were entirely reasonable. A number of sales were made at each of the exhibitions, and at the end the entire exhibit was disposed of.

BIRD LIFE IN MOVING PICTURES

THE Chief Game Guardian for Saskatchewan, Mr. F. Bradshaw, recently returned from Lake Johnstone, where in company with a photographer employed by the Dominion Government, some quite unique motion pictures of bird life were obtained. "The experience," said Mr. Bradshaw, was exceedingly interesting, and the pictures secured will be of great educational value. Up to the present in illustrating lectures on bird life, for instance on the Better Farming Train, it has been necessary to go far afield for the pictures required, and it will be far more interesting to be able to show

intimate pictures of the domestic life and arrangements of our native birds."

In Lake Johnstone there is a large island, a bird sanctuary, which is the resort for breeding purposes of innumerable birds of the rarer kinds. Pelicans, gulls, terns, cormorants, and the beautiful Great Blue Herons, are seen in thousands. The half-grown pelicans were marshalled and driven past the camera like a flock of sheep, and Mr. Bradshaw gave many of them their first lesson in swimming, when fine pictures of them were secured. The herons made good subjects for the camera, where stand-

ing motionless as statues on a rock or soaring like a fleet of aeroplanes overhead. The birds were extremely jealous of the intrusion of other birds on what they considered their own domain. If a young gull was seen swimming near where the terns were domiciled, the latter would form a regular procession and each tern on arriving over the gull made a marvellous swoop and administered a peck, each drawing blood from the head of the luckless intruder.

Many successful pictures were secured of pelicans from a leathery

ball the size of the doubled fist to the size of a goose; of the cormorants in their rookeries; of nests and eggs; and most wonderful of all were pictures showing the beautifully graceful flight of the tern which from its swoops and gyrations has been called the sea swallow.

It is intended to reduce and adapt the films, for use in the Pathoscope machine, now in possession of the Department of Agriculture so that these pictures will doubtless in the future give pleasure to thousands.

IMPORTATION OF CHOICE PURE-BRED SHEEP

THE Department of Agriculture of Saskatchewan is importing into the province from Ontario a carload of very choice sheep, chiefly ewes, and the majority of the Shropshire breed. These sheep will

be sold at auction at the two sales to be held at Regina and Saskatoon. The sheep have been selected by Mr. J. G. Robertson, Live Stock Commissioner for the province.

PLOUGHING MATCHES

THE ploughing match season for Saskatchewan is over for this year, as these activities are usually held during the month of June and the early part of July. These matches were for the most part successful, there being a good number of competitors and in most cases a large number of interested spectators. About sixty of these matches were held this year which is a substantial increase over the number held in 1918. The revival of interest in these activities is perhaps largely due to the matter being brought clearly to the attention of the societies through a circular sent out by the director early in the year.

SUGGESTED RULES FOR PLOUGHING MATCHES

The following rules have been compiled from those in force at numerous ploughing matches. They are intended as a guide to the agricultural societies and may have to

be changed to suit the particular ideas and conditions of any society.

The three following suggestions are given as to who shall compete:—

- (a) Competition open to all comers except ploughmen who have won two championships. If desired a separate competition may be put on for these.
- (b) Competition open to all members of the agricultural society.
- (c) Owners of teams or their *bona fide* servants must operate ploughs.

RULES

1. Entry fee of \$1.00; boys under 16 free. Any one contributing \$2.00 or over to the prize fund will be allowed an entry for himself or servant.

2. All entries must be made before 9 a.m. on the day of the match, but intending competitors are especially requested to notify the secretary at least three days in advance, so that the ground may be staked out in time.

3. All ploughmen must be on the grounds before 9.30 a.m., when lots will be drawn

for position. Ploughing will start by signal at 10 a.m. and must be completed by 4 p.m. Any ploughmen coming after lots are drawn will be obliged to take his lot in rotation with those who have drawn and finish not later than the time limit. Any ploughman not finished when time is called will be ruled out.

4. The land to be ploughed shall not be more than $\frac{3}{4}$ acre for single furrow ploughs and $1\frac{1}{2}$ acres for two furrow ploughs.

5. Each ploughman will make one strike out and one finish. All crowns must be opened out deep enough to cut all weeds and grass. Five rounds shall constitute a crown.

6. No person will be allowed to interfere with or help the ploughman except in setting up and removing poles, and no person will be allowed to accompany the ploughman.

7. In all cases the crowns must be opened out and finished with the same plough and team that is used throughout.

8. The depth of the ploughing to be six inches and the width of the furrow the same as the width of the plough used. This depth should be reached by the third round after opening up. The sole furrow is not to be lifted. Ploughmen are not required to finish a furrow of full width.

9. Gauge wheels to be used in all classes.

10. Chains or other devices for covering weeds to be allowed, but all weeds must be cut.

11. No pulling or covering of weeds with either hand or foot, or tramping of land with feet allowed. Anyone not conforming to

this rule will be reduced one point for each offence.

12. In any class where not more than one entry is made the judge shall decide what prize, if any, shall be awarded. The judges have a right to withhold a prize if 50 points have not been made.

13. Any ploughman not conforming to the above rules will be disqualified.

14. Protests must be lodged with the secretary by noon of the day following the match, and must be accompanied with a deposit of \$2.00. The decision of the committee in charge of the ploughing match shall be final.

SUGGESTED EVENTS

1. Men's 14 inch walking plough.
2. Men's 16 inch walking plough.
3. Men's 16 inch sulky plough, 3 horses.
4. Men's 2 furrow gang, 14 inch, 4 horses.
5. Men's single disc plough, 3 horses.
6. Boys under 16, 14 inch walking plough.
7. Boys under 16, 16 inch walking plough.
8. Boys under 16, 16 inch sulky plough, 3 horses.
9. Boys under 16, 2 furrow gang, 14 inch, 4 horses.
10. Boys under 16, single disc plough, 3 horses.

Similar prizes may be arranged for young men from 17 to 21, or 24.

If little work is done in the district with walking ploughs they may be dropped out and the prizes given for the kind in general use.

PLOUGHING MATCH SCORES AS USED BY VARIOUS SOCIETIES

	Crown or feering	Straight- ness	In and out at the end	Depth of furrows	Width of furrow	Even- ness of top land	Finish	Covering weeds and stubs	Total
Brandon, 1901 .	12	15	8	15	10	10	10	20	100
Brandon, adopted for 1903	15	15	6	6	6	10	12	30	100
Welwyn, 1902	15	15	6	6	6	10	12	30	100
Welwyn, suggested by judges for 1903	15	10	10	10	10	10	15	20	100
Virden, 1902	15	15	10	10	10	5	15	20	100
Portage la Prairie, 1902	15	15	10	10	15	10	15	20	100
Blyth (oldest ploughing match)	13	15	10	7	8	10	12	25	100
Treherne	15	15	5	10	10	10	15	30	100
Oak Lake	10	10	10	10	10	10	10	30	100

These scores show a close similarity. That suggested by the judges at Welwyn for 1903 and used at Virden for 1902 is one of the best. A score of six points for width and depth of land does not allow the judges enough margin. Ten points is enough for

this and can be made up by reducing the points for covering weeds to 20 and still allow this to be high enough to almost control the score. The judges who suggest these changes are old and experienced ploughmen.

ALBERTA

NEW FARM SCHOOLS

BY AUBREY FULLERTON

THREE new agricultural schools are being built this year by the Alberta government.

They will supplement the three already in operation and will be conducted upon closely similar lines, but after an enlarged and improved plan. Alberta has now had several years' experience of its localized farm school policy, and has found the results so generally satisfactory that it purposes to continue it in preference to the one big school method that is being followed elsewhere.

Gleichen, Youngstown, and Raymond are the new college centres. At each of these places there is now being built the first unit in what will ultimately be a complete teaching, boarding, and demonstration plant for the making of trained farmers. The buildings will be of uniform style and size in each case and will be equipped for experimental and academic work in all departments of agricultural science suited to the Prairie Provinces.

A group of three buildings at each of the three points will be erected this year. The college building proper will be of two stories and basement, solidly built of brick and stucco. The original schools at Vermilion, Olds, and Claresholm are frame buildings, but the government, having satisfied itself that the system is a good one, has now decided to build more permanently.

THE SCHOOL BUILDINGS

The architect's plan provides for an agronomy laboratory, dairy room, poultry room, and laundry in the basement; chemical laboratory, library, domestic science room, dining room, one class room, and administrative offices on the main floor; physics laboratory, class room, sewing room, home nursing room, and assembly hall on the top floor. The

cost of the school building will be \$60,000.

A blacksmith and carpenter shop and power house will be directly at the rear of the school, and closely adjoining the power building will be the animal husbandry building. These two buildings are to cost about \$25,000, making the complete outlay on the first unit of the college plant \$85,000.

Six other buildings will remain for next year's programme. They will comprise residences for the principal and farm superintendent, a boarding house for the farm crew, silo and cattle barn, horse barn and combined implement shed and granary. Eventually a dormitory for the students will be added between the school and the other buildings, but in the meantime, living accommodation will be furnished by the townspeople on the old-fashioned boarding principle.

PROSPECTS FOR GOOD ATTENDANCE

The term of 1918-19 was broken up at the Alberta farm colleges by the influenza epidemic. It had given promise of being a record year, and it is now expected that, despite partial crop failures in the southern and eastern portions of the province, the coming session will make up for time lost last year. The 1917-18 attendance at Vermilion, Olds, and Claresholm was 328 students, and Gleichen, Youngstown, and Raymond will likely add from 80 to 100 each to that number. The chances are that Hon. Duncan Marshall, who, as minister of agriculture, is largely responsible for the system of local farm schools, will not be satisfied till there are 1,000 young men and women studying farm science in the Alberta provincial colleges, and even now, that day does not seem at all remote.

RYE SEED FOR SETTLERS

BY JAS. MCCAIG, PUBLICITY COMMISSIONER

A FEATURE of the work of the Alberta Department of Agriculture in behalf of the people suffering from drought conditions has been the furnishing of fall rye seed under the same kind of arrangement as the advancing of seed grain has been in the spring of the last two years. The arrangement was intended principally to assist the smaller farmers. Seed rye to the amount of twenty-five bushels could be secured by lien note running until December 1920, the price averaging \$2.25 per bushel. The supply of this was dependent upon the total supply in the Dominion elevator at Calgary.

Rye is recognized as one of the best crops for Southern Alberta that we have. It has been largely employed to prevent soil blowing. It does not kill under adverse winter conditions the same as wheat does because it

does not seem to have the same soft open cell structure and when the snow goes off in the spring it is immediately ready for grazing. It is generally sown as early as July and furnishes fall grazing also. In the spring it is used up to about the 20th of June at which time it gets slightly bitter but if immediately cut makes good hay or if relieved of stock a little earlier will give a good crop of grain running from twenty to twenty-seven bushels per acre. After open prairie land has been ploughed and enclosed for grain growing it means pretty nearly a straight grain programme because our common tame hay grasses and pasture plants are hard to set in prairie land and such crops as rye and grain mixtures have been used to furnish a top of succulent summer feed for stock.

BRITISH COLUMBIA**COW TESTING ASSOCIATIONS**

BY L. A. F. WIANCKO, PROVINCIAL DAIRY INSTRUCTOR

THE keeping of records of the production of dairy cows in some intelligible and dependable form is very largely responsible for the rapid development and improvement which has taken place in our dairy herds in the past few years. In this respect the dairymen of British Columbia have been doing some very good work, especially in connection with keeping records of grade dairy cows. It must be recognized that for many years to come the great bulk of our dairy production will be done with grade cows. It is not everyone who can go in for pure-bred dairy females, and from our best graded female stock must come our future dairy herds. The idea that the grade cow has no value as a breeder has little weight among dairymen who know the real situation.

It is because she has a real value as a breeder that our best dairymen are anxious to take up cow testing work so that they may know more definitely from which cows it will be worth while to save the heifer calves. Many tested grade cows have been sold for \$200, and more, and surely in setting such a price the buyer had something in view besides simply an animal to produce milk for a few years.

At the present time there are in successful operation in British Columbia, five cow testing associations with a total of 140 members who are owners of some 2,400 cows. The first of these associations was started in the Chilliwack Valley in the early part of 1913, and others followed at Comox, Langley-Surrey, Delta and Richmond, and had it not been for

the difficulty in securing the services of competent cow testers during the years of the war, associations could easily have been established in other dairy districts.

The organization of these associations is about as follows:—organized under the *Agricultural Associations Act*; they consist of a president, vice-president, secretary-treasurer, and several directors. Members of the association agree to submit their entire herd of cows for purposes of ascertaining their production by means of weights of milk and Babcock test for butterfat. Members agree to pay one dollar per year per cow for this service, the balance of the tester's salary being made up by the department of agriculture from funds derived from the federal grant under the *Agricultural Instruction Act*.

A man experienced in handling the Babcock test and with the required knowledge in dairying is engaged by the department of agriculture to supervise the testing and to keep the record of each cow under test. This man visits each farm under his supervision once each month. He usually reaches the farm in the afternoon in order to be on hand for the evening milking. He proceeds about as follows:—

1. Weighs and samples the milk from each cow that evening.
2. Makes an estimate of the feed given each cow per day.
3. Again weighs and samples each cow's milk the following morning.
4. Tests the samples of milk of each cow for per cent of butterfat.
5. Computes the total feed consumed for the month by each cow.
6. Computes the total milk produced for the month by each cow, using the weights obtained as an average.
7. Computes the butterfat produced for the month by each cow, using the average test as the test for the month.

8. At the end of the test year he computes the profit or loss for each cow by charging the animal for feed consumed, figured at reasonable prices, and crediting her with milk and butterfat produced.

Thus, at the end of a cow's lactation period the farmer has before him in a concise form full particulars regarding the cow's performance, including costs of feeds, and such particulars as the cost of producing 100 lbs. of milk, cost of producing one pound of fat, profit over cost of feed, etc. The information afforded by these records gives the farmer a very close approximate of the profit or loss of each individual cow in the herd.

The testers are paid a salary of \$85 per month, their board being supplied at the several farms as they make their monthly rounds, and this together with incidental expenses for glassware, acid, and other supplies brings the total annual expense of running each association up to about \$1,050.

The supervisors of the several associations have devoted their best efforts to the work, and have in addition to their routine work of testing and keeping the necessary records, made themselves very useful by helping the members to improve their herds by a better system of breeding, and to increase their profits by more judicious feeding with a greater variety of, and better balanced rations.

After an experience of up to six years with these associations, we find that the work is being constantly more highly appreciated by our dairymen, and many enquiries are coming in from districts wishing to organize new associations. We believe, further, that these associations have been the means of starting some of our present progressive owners of high producing cows on the way to permanent success, and have by example assisted to a very great extent many other dairymen.

PART III

Junior Agriculture

DEMONSTRATIONS, COMPETITIONS, AND CLASS-ROOM STUDIES IN RURAL LIFE FOR BOYS AND GIRLS

NEW BRUNSWICK

AGRICULTURAL EDUCATION IN THE RURAL SCHOOLS

BY C. C. DOUGLAS

Many centuries ago, when books had still to be invented, the only method of education was imitation. One man learned from another by copying his methods of labour and his implements, but with the invention of the printing press and the making of books a change came. Schools were formed and the education of pupils consisted of memorizing their texts and doing mental problems but any practical or actual problems were unthought of.

Then slowly, through a long term of centuries, the practical began to replace the theoretical method of education and the problems of the pupil began to be worked out in actual practice with the subjects of his problem.

In just the same way, and under almost the same conditions, has the subject of agriculture in schools been introduced. Let us trace its development.

First, it started many years ago in the form of nature study. This consisted of memorizing vast quantities of literature on the origin, species, and genus of plants, without even a specimen of the plant to note its characteristics which they were trying to memorize from the text. The folly of this was soon perceived and at length the text book was set aside except as a reference for the teachers and the pupils who had advanced far enough in nature

study to use it, and the nature lessons in the school became actual object lessons in the living plant or animal which the pupils could observe and by careful investigation discover for themselves that which heretofore had been given them from books. Thus began practical nature study.

But in the course of time a phase of this nature study grew into such importance that certain educational leaders recognized its value as a subject by itself but closely related to nature work in the school. This is what we to-day call agricultural education and are endeavouring to advance another step towards the practical by establishing it as an important part of education in our schools.

The value of agricultural education can readily be seen from the result obtained in other countries, chiefly in the United States, where they are making very rapid strides in advance.

At the present agriculture is taught in our schools up to Grade VIII only, but the United States have given agriculture a prominent place in all the grades of many of their high schools, and the pupils besides caring for their school garden and home plots, may choose some subject for home project work and specialize in it. They receive careful and up-to-date instruction from the teachers on the proper methods of management and care and the

projects selected are many and varied, including grains, vegetables, live stock, and beekeeping and some remarkable profits have been made by the pupils from the sale of produce. This, however, is not the most important part of the work nor does the real value lie in the increased interest in agriculture which these projects bring, but it is the development of power in the pupil, through these experiences, to carry this or any project to a successful conclusion.

So when we follow the example of these progressive schools which have developed in other countries and have proved to the young sons and daughters of the farmers of New Brunswick that in farming they can find a pleasant and paying occupation we shall be going a long way toward putting a stop to the emigration of boys and girls from the farms to the cities which has been and is going on to such an extent that the situation of food production has become alarming and some means to prevent disaster is necessary.

It is a well known fact that as we grow older habits grow stronger, and the harder it becomes to change one's views or persuade a person to try a newer and better method

of working than that to which he has become accustomed. 'Tis thus with the majority of farmers to-day. They have been working along a certain routine with very few changes for a life-time, and although better methods of farming have been discovered and set before them, chiefly by means of experimental farms and other government projects, they take little heed of this valuable help. The only way left then to reform the farming methods to a more modern basis is through the rising generation who with the proper instruction in agriculture at school and the pig and poultry clubs or any home project work, can see for themselves the advantages of scientific agriculture and will be only too pleased to put into practice on their own farms at a later date those ideas which they received from their agricultural education in the schools. And yet this result of their training is only incidental. Its main purpose is to develop higher ideals of citizenship, the moulding of strong characters, patriotic men and women with a power to do, no matter what vocation is theirs, in short, "Mastery for Service" to this our great country.

MANITOBA

PURPOSES AND AIMS OF BOYS' AND GIRLS' CLUBS

IN a series of lectures recently delivered to the Rural Ministers attending the summer course at the Manitoba Agricultural College Professor O. H. Benson outlined the purposes and aims of the boys' and girls' work in agriculture and home economics as follows:—

1. The most important project in boys' and girls' extension work is club work, the organized groups of girls and boys for the purpose of improving agriculture and home life.

2. Extension work with boys and girls covers the entire field of agriculture and home economics. The subject matter lines are organized into projects and both club members

and leaders follow the programme of work covering the entire calendar year, and are directed by trained leaders who know how to make farm and home work an interesting game.

3. Boys' and girls' club work is so planned as to help boys and girls to get the correct point of view in regard to agriculture and home making as a vocation, and if best fitted for those vocations to give them a fair chance in planning for life's work in farming and home making. Its relation to the agricultural colleges, schools teaching agriculture, and the Smith-Hughes vocational courses is that of helping the young people to appreciate the need for

a more thorough preparation in this work.

4. Through club organization work, contests, and the help of efficient leaders, farm and home work become a good game instead of drudgery, and the standards of achievement met by leaders are more easily reached because of the interest, enthusiasm, and reinforcement received from this organized effort.

5. Boys' and girls' club work trains for community leaders out of community life itself and functions for future co-operative enterprises so essential to successful farm life.

6. Club work socializes community life and gives young people interest and motive for their work.

7. Club work trains the young people to become managers of their own business and proprietors of farm land, animals, machinery, crops, kitchen equipment, Victory bonds, thrift stamps, and helps them understand the supremacy of this position over that of being always a wage-earner.

8. Boys' and girls' club work produces and conserves food to meet local, national, and world needs on an economic basis.

9. Club work engages the best thought, energy, and interest of every boy and girl in the business of farming and home making. This work is a practical, back-to-the-home "Made in America" type of education, not fully provided for in the public school curricula nor by the Smith-Hughes vocational courses. It works with children, both in and out of school and of all ages from 9 to 21.

10. Club work demonstrates how to make farming and home making a practical business and give the rural young people an argument to help them refuse positions in the city.

11. Boys' and girls' club work deals with groups of boys and girls as well as with individuals, trains volunteer leaders, co-operates with schools, churches, Y.M.C.A. leaders, encourages, directs, and organizes

them for short courses, boys' and girls' institutes, boys' and girls' camps, field trips, field demonstrations, club fairs, festivals, demonstration contests, training conferences for leaders, and other activities essential to the complete development of the agricultural and home economics programme in a given community outside the college of agriculture.

12. Boys' and girls' club work is just as important for city boys and girls as it is for rural. The rural boys and girls need the club group work because of their isolation from social life and their lack of community leadership. The city boys and girls need it in order that their gangs and cliques, with often-times detrimental programmes, may be transformed to constructive, creative, and helpful club work programmes through which they may become familiar with America's greatest industry—agriculture—and the fundamental principles of home making. Club work does not recognize class distinction in the service of boys and girls. Members of club groups of both rural and city young people attend the same club meeting and work together on a common programme of work for the improvement of agriculture and home life.

13. The co-operation of boys and girls in extension work through their club groups on projects such as poultry, gardening, canning, dairy, and home drying is on the same basis as the attendance of boys and girls at their classes at school, without any hard and fast rules as to sex division.

Professor Benson, who is now Director of Boys' and Girls' Clubs for the United States Federal Department of Agriculture, is the man Herbert Quick had in mind when he wrote his book "The Brown Mouse". Starting as a teacher in a rural school twenty-five years ago Professor Benson to-day knows his work thoroughly from a practical standpoint, and is an authority on boys' and girls' activities in rural communities.

SASKATCHEWAN

SCHOOL FAIRS

A GREAT stimulus to educational efforts in a dozen school districts in Saskatchewan has been given by the success of the Weyburn school exhibition. The outcome of this event will prove a big incentive for hard work on the part of both teachers and pupils during the coming year. This fair, as well as nine others organized in rural municipalities, was under the supervision of Inspector Kennedy, who, during the past ten years, has spent considerable time in promoting this sort of co-operation among the schools. For Weyburn rural municipality, the fair has been held in the city of Weyburn ever since 1914. The first rural educational association was organized here and great interest is taken in the school activities by both the city of Weyburn and the rural municipality. The rural municipality makes a grant to help cover the expenses, the board of trustees are asked to donate \$15 for each class

room and the agricultural fair board gives the use of their buildings free of charge. At each of these school exhibitions a well planned programme is carried through, the parades and specialties being shown outside while the judging is being done inside the buildings.

The rural educational association of Weyburn rural municipality spends great care and forethought over the preparations for their fairs. Posters are printed giving a complete list of possible entries, a full sports programme, and announcements regarding boys' and girls' club work. These being placed in a conspicuous place in all school rooms give every pupil a chance to know all the rules and regulations. From year to year new features are added, but the general scheme remains the same, so when a teacher, who may not have made a good showing in the list of winners, goes back he is prepared for better things the next time.

THE SASKATCHEWAN FARM BOYS' CAMP

BY J. G. RAYNER, B.S.A., DIRECTOR OF BOYS' AND GIRLS' CLUBS

FOR the last five years the Regina Exhibition Association in co-operation with the Extension Department of the University and the Department of Agriculture has staged a special educational feature for the farm boys of Saskatchewan, known as the "Farm Boys Camp." The late Lieutenant H. M. Thompson, while engaged as Weeds and Seed Commissioner for the province, originated the idea of this farm boys, congress. He reasoned that if the development of the Agricultural resources of the province is one of the surest ways of meeting present obligations and building on a sound foundation for the future—one of the most logical steps toward this end would be the proper training of those into whose hands would be

given the duty of developing these resources, and accordingly he aimed to be of special service to the farm boys.

Lieutenant Thompson, with the co-operation of the above named agencies brought 200 boys to Regina during the week of the Regina Exhibition in 1915. This made up the first camp. The boys took part in judging competitions; listened to lectures by experts; and engaged in various organized games and drills under the direction of the Y.M.C.A.

Since then the camp has become an annual event. In the five years since it first convened, upwards of 1,100 farm boys have attended, and practically that number of homes have been given a direct interest in the efforts which are being expended

for the country boys. It is a very memorable day for most of the boys, many have never seen a city or a large exhibition and after a week at the capital city, in which a visit is paid to the Parliament Buildings and other points of interest and to the exhibition, these boys return home with a better understanding of the many things it takes to make up a province and a nation. They have taken a step toward more intelligent citizenship.

The 1919 camp was the most successful yet held with a total attendance, including both boys and leaders, of nearly 300. The boys come in teams of five under the charge

Camp cots were provided for the boys; they brought their own bedding; and meals were served, cafeteria style, from the domestic science room of the school.

The contests consisted of competitions in the judging of draft horses, beef and dairy cattle, and swine, as well as identifying weeds. The stock judging contests were conducted in the exhibition grounds and the animals used for the demonstrations and contests were selected from among those exhibited at the fair.

Much improvement in the quality of the work done in these contests during the last two years has been



GROUP OF BOYS ATTENDING FARM BOYS' CAMP AT THE REGINA PROVINCIAL EXHIBITION, 1919

of a supervisor or leader. The only expense to the boys was their railway fare to Regina, and where this amounted to over \$7.50 per boy the amount in excess of this figure was refunded to them. While in Regina they were the guests of the Exhibition Association. The program consisted largely of stock judging competitions conducted by members of the University staff. The camp recreation, including physical training, mass athletics, group games, etc., was directed by the Y.M.C.A. The whole camp was housed in one of the finest public schools in the city of Regina. This building was very convenient to the exhibition grounds and proved a very suitable location.

noticeable. This is the result of the preparatory courses put on by the extension service of the college of agriculture at all points from which teams were entered. Instructors were sent out and demonstrations given with the various classes of live-stock, following which the boys were given training in the use of the score card and in comparative judging work. The usual method was to gather the boys at some central point then take them in automobiles to good stock farms nearby. At some points very notable stock farms were visited, among which was the "Bryce" farm of Arcola and the farm of Geo. Rupp of Lampman.

An endeavour is made to give edu-

cational prizes in-so-far as possible. This year six \$50 scholarships to the Saskatchewan College of Agriculture were awarded, one to the boy making the highest aggregate score in all contests and one to the boy making the highest score in each contest. In addition to these prizes, others were given in the nature of books, with a few cash prizes.

This "Farm Boys Camp" more than any other agency has brought the needs of the farm boys to the fore. In most cases the teams are sent to Regina, under the auspices

of the agricultural societies of the province, and it has directed the attention of these societies to their opportunities for service to the boys. Particularly has this been noticeable in the increased number of stock judging competitions provided for at agricultural and school fairs.

Interest in the work the camp is doing is growing steadily and the movement will continue to be developed with the supplying of the needs of our country boys, the central object in view.

ALBERTA

WOMEN'S INSTITUTE GIRLS' CLUBS

THE Women's Institute home nursing instructors found their nursing and first aid courses were of particular interest to the girls of the communities visited in 1918. The girls of teen age were most enthusiastic, they did not wish to give up the subject after three days' instruction. Upon their own suggestion they organized girls' clubs and appointed supervisors from the Women's Institutes. Books on home nursing and first aid were sent to them upon request. When they completed their home nursing and first aid studies they looked for other fields to conquer. The First Aid Club gradually developed into a society of many interests, each club supplying the need of the locality. A number of girls' clubs were organized during 1918 and each club had its own splendid story of interest. The demands for organization increased, the girls themselves were anxious for social and educational improvement.

In 1919, the Legislature passed an amendment to the Act respecting Women's Institutes creating Women's Institute Girls' Clubs. As a result, eight girls or more living in any rural community, village, town or city may if they desire form a club receiving the benefits and assistance of the state as indicated in the

constitution of the Women's Institute Girls' Clubs.

The lack of good wholesome companionship is felt by thousands of girls in the Prairie Provinces. Girls of rural communities, especially those living on farms find that often weeks and months pass without being able to see another girl of their own age. A discussion led and participated in by a number of young people is one of the best of educational exercises. One prominent woman who lived as a girl in an institutional home has written, "A number of us were in the habit of gathering in one room to discuss the problems of the day, at first principally local affairs, but later we presumed to discuss those of national importance. In those discussions we often solved a problem in a manner that would be of credit to a statesman. We really lived; how we gloried in our solutions and utopias." The Women's Institute Girls' Clubs hope to give the opportunity of such companionships, not only with just the girls of their own community, but also those of the entire province.

RECREATION

An important phase of the Women's Institute Girls' Clubs should be the encouragement of organized recrea-

tion, the girls' clubs could very well be the enthusiastic factor in promoting athletics, the establishment of skating rinks tennis courts, basketball, girls' base ball, and the arranging of social good times. It is quite possible that girls in some centres will be able to arrange for classes in physical culture. The experience in team-work teaches the girl to overcome her prejudices, to be broader minded, to co-operate, to sink her personal ambitions in the good of the organization as a whole; just as in the base ball team she may not like a certain girl but if that girl is the best pitcher she learns to be glad to let her pitch.

STUDY

Many a clever, capable, and ambitious girl who is making a splendid success of her work at home or in the office has been heard to say, "I wish I could have gone to school longer," or, "I wish I could really study something interesting with some other girls."

"First aid," "home nursing," "sanitation," "home decoration and furnishing," "legal status of women," and innumerable other subjects would be interesting, and be excellent lines for study in study courses.

If up to date and practical books on ethics, sociology, civics, and history were used as texts for study courses, girls would be materially benefited. Study of poetry and fiction would also be desirable. The department will supply one copy of an approved book on each desired subject. This book will be the property of the Girls' Club until they have finished using

it, when it shall be returned to the department.

LITERARY AND DRAMATIC

With good leadership, literary meetings consisting of debates and addresses would not only be entertaining but also educational. For instance, a series of addresses on how we are governed, as a municipality, a province, a Dominion, and an Empire, could furnish interest for several meetings. These meetings could be held in conjunction with a boys' club or Women's Institute.

RELIEF WORK

Work could be undertaken to raise money for charitable purposes.

SEWING

For a time a Girls' Club might convert their organization to a sewing club. In this case it would be wise for the supervisor appointed to take charge as instructor.

GARDENING

During the spring and summer months a garden competition between the girls in one club could be arranged.

CANNING CONTESTS

Perhaps there is no more interesting and practical work than canning for the girls to do at home. Prizes are given at fairs for canned and dried products. Exhibits of girls' work would be of splendid value at a constituency conference.

THE COURSE OF AGRICULTURE FOR HIGH SCHOOLS

IN the absence of a suitable text book on the subject of agriculture for high schools, the Alberta Department of Education has issued, for the guidance of teachers, an outline of the course of agriculture to be taught. "The course is divided into

eight parts and covers plant studies, plant propagation, soils, soil physics, soil chemistry, the application of the principles of soil physics and chemistry to soil management, animal studies as related to plants and animal husbandry.

Plant studies are divided into plant improvement, field and garden crops and seeds in Alberta, weeds, plant diseases, and the climate of Alberta in relation to crop production.

In plant propagation study is given to propagation by cuttings, grafting, budding, and layering.

Soils are studied in regard to their origin and formation, transportation and deposition, physical properties and how modified, and the agricultural classification of soils.

Under soil physics consideration is given to water, air, and heating in relation to soils.

Under soil chemistry fertility and maintenance of fertility are studied.

Under the application of the principles of physics and chemistry to soil management the preparation of the seed is dealt with as well as the preparation of virgin soils, soil manage-

ment in relation to bacteria, transplanting plants, rotation of crops, and osmosis in relation to plant feeding.

Harmful and beneficial insects, birds and other insect destroying animals are considered in animal studies as related to plants.

Under animal husbandry the leading breeds of stock are dealt with as well as dairying, principles governing care and improvement, and the foods used in animal feeding.

Laboratory exercises and outdoor observation are recommended to demonstrate the lessons taught in the lecture programme.

The teachers are directed to sources of suitable literature which includes a number of text books as well as the government publications issued by the Alberta and Dominion Departments of Agriculture.

BRITISH COLUMBIA

A RECORD BOOK FOR BOYS' AND GIRLS' CLUBS

FOR the convenience of the members of boys' and girls' clubs in British Columbia, the British Columbia Department of Agriculture provides blank note books ruled to receive notes, the financial statement and an essay regarding the competitions they conduct. The

competitors are urged to enter their notes as the work proceeds in order that items may not be overlooked. The book provides four pages for the essay which is not to exceed 200 words. Following is the form used for the financial statement for the potato growing competition:---

FINANCIAL STATEMENT

EXPENSES			RECEIPTS		
	\$	c.		\$	c.
Rental of land at \$10 per acre ..			Total value of saleable potatoes at \$20 per ton		
Cost of Labour:			Total value of cull potatoes at \$5 per ton		
Horses (each), 20c. per hour			State of Profit and Loss.		
Competitor, 15c. per hour			Total value of crop.		
Other assistance, 25c. per hour			Total cost of production		
Cost of Manure:			Net profit or loss		
\$2 per 2-horse load on the land			Net cost of producing one ton		
Cost of fertilizer			Net profit per acre		
Seed.					
Cost of seed					
Cost of treating seed					
Cost of cutting seed.					
Irrigation (each), 20c. per hour					
Spraying material					

PART IV

Special Contributions, Report of Agricultural Organizations, Publications, and Notes

ASSOCIATIONS AND SOCIETIES

EVENTS OF THE COMING MONTH

Nov. 1, Province of Quebec Society for the Protection of Birds, Field Day, Mount Royal; secretary G. M. Dyer, 12 Willow Ave., Westmount, Que.

November 3rd—7th The Hamilton and Wentworth Poultry Association Show; secretary, Herbert Hall, 405 Mary St., Hamilton

Nov. 4, All entries, on printed forms for the Ontario Horticultural Exhibition will be received by A. H. McLennan, Parliament Buildings, Toronto.

Nov. 6, 7, The Entomological Society of Ontario will hold its fifty-sixth annual meeting at Ottawa in the lecture hall of the Carnegie Library; local secretary, Arthur Gibson, Entomological Branch, Department of Agriculture, Ottawa, Ont.

Nov. 10, 12, Biennial Convention of Federation of Women's Institutes, Toronto, Ont.

November 11th—Dundas and North Wentworth Poultry and Pet Stock Association Show; secretary, H. T. Wilson, Box 342, Dundas.

Nov. 12, 13, Annual convention of the Quebec Beekeepers' Association to be held in the National Building at Montreal; secretary-treasurer, J. Armand Prud-Homme, Ste. Philomene, Quebec.

November 12th, 13th, 14th—Women's Institute Convention to be held in Toronto, Ont.; secretary, Geo. A. Putman, B.S.A., Parliament Buildings, Toronto.

Nov. 17, 22, American Royal Live Stock Exposition, Kansas City, Mo.

Nov. 19, 20, The Manitoba Shorthorn Breeders' Show and Sale, Brandon; Secretary, H. B. Davidson, Myrtle, Man.

Nov. 24, 28, Regina Winter Fair, Regina, Sask.; secretary, D. T. Elderkin, Regina.

Nov. 27, 28, Sheep and Swine Sale under auspices of Sheep and Swine Breeders' Association to be held at Regina.

Nov. 29, Dec. 6, The horse show in connection with the International Live Stock Exhibition at Chicago; secretary of the Horse Show Committee, O. P. Heinkle.

Nov. 29, Dec. 6, International Live Stock Exposition, Chicago, Ill.

CANADIAN SOCIETY FOR THE PROTECTION OF BIRDS IN ONTARIO

BY LAURA H. DURAND, SECRETARY

Few people are aware of the amazing number of insect species. They outnumber by far the total of the species of all other living creatures. Over 300,000 species of insects have been already named and described by entomologists, and it is believed that twice that number remain to be classified.

FECONDITY OF INSECTS

Along with this astonishing variety of insect life is the more astonishing capacity most of the species possess for reproduction. Their fecundity is almost beyond belief. Take the aphids, for example. This family exhibits neutrals as well as true males and females, the neutrals having the capacity to produce sexless individuals in rapid succession. The aphidae family are plant suckers. The hop aphid develops thirteen generations in a single year. If unchecked at the end of the twelfth generation a single

pair of these insects would have multiplied to ten sextillions of individuals, which if marshalled in line ten to an inch, would reach to a point in the universe beyond the farthest star.

LARGE APPETITES OF INSECTS

Besides the overwhelming variety and fecundity of insects is their voracity, which is equally marvellous. All eat enormously. A caterpillar will eat twice its weight in a day. Certain flesh-eating larvae (the grub or maggot form of insect transformation) consume in one day two hundred times their original weight.

BIRDS AS INSECT CONTROLLERS

Who or what is it that prevents these hordes from overwhelming the earth and consuming the food supply of mankind?

It is not man. By ceaseless exertion and spraying with costly poisons we can save

our gardens and orchards from being destroyed. But we cannot spray the forests and fields, the meadows and groves which make the world habitable.

What saves the vegetable world? It is the bird, and this by reason of its predominating insect diet.

Some species of insects are very useful agencies in the economy of nature, such as the bees, which fertilize the blossoms, and predaceous beetles, and scavenger species, such as ants, and parasite species which deposit their eggs in the bodies or on the cocoons of other insects.

But birds are the primary and main check on the increase of destructive insects, and this is their mission in organic nature—a place no other species and no other agency can fill.

The relation of birds to insect life merit the utmost thought, study, and intelligent consideration of governments and all who are responsible for the welfare of the country.

At this serious crisis in the world's food supply every effort must be put forth to protect insectivorous species of birds. People must be informed of their priceless value to the country. The terms of the treaty regarding migratory birds, ratified in 1918 with the United States, must be vigilantly enforced, and regulations made in every province to make fully effective the splendid Act passed in July, 1917, by the Dominion Parliament, known as the Migratory Birds Convention Act.

BIRDS A PRICELESS ASSET

Canada should welcome every insectivorous bird returning to us each spring as a

priceless asset. All through the winter the creepers, the nuthatches and wood-peckers quietly perform the colossal labours assigned by nature, and clean up the trunks of trees by eating countless insect eggs and larvae, while the chickadees, kinglets, finches, redpolls and others search every limb and twig and withered leaf for dormant insect life. The weed-seed eating birds, the grosbeaks and snowflakes, come down from the untrodden forests of Hudson Bay and Labrador, following the diminishing heads of the weeds in the drifting snow. These species return in the spring to the north, and there arrives an army of warblers from the south lands, the tiny saviours of the forests, who, with the wee kinglets and tireless chickadees, explore the leaves and blossoms for insect pests. The grub-searchers return, the robins and meadowlarks, the fly-catchers, the martins and swallows, the weed-seed eating sparrows and finches, the cuckoos, who eat both the tent and hairy caterpillars, the orioles and many more—in a tide of beauty and song to bewitch our eyes and ears, while they perform for us an inestimable service.

And lying in wait for these, our deliverers, are thousands of untutored boys with slings and air-guns, and millions of useless house cats. The remedy for the boy is the Bird Club, which should be organized in every school in Canada; and the remedy for the cat is the license and the humane lethal chamber. It should be accounted treason to let a cat roam at large in the nesting season.

CANADIAN FLAX GROWERS' ASSOCIATION

The Canadian Flax Growers' Association at their meeting in London, Ont., arranged that their members should send five-pound samples of seed from each mill to the Experimental Farm at Ottawa where these will be tested and a sample bag forwarded to European importers.

The report of the federal Seed Branch to members of the Association was read and considered and after the following discussion it was moved and seconded "that this Association desires to place on record its approval of the report of the Seed Branch and all

the conditions thereby established for the grading, inspection and certification of Ontario flax seed for export purposes; and it is of the opinion that the conditions therein stated should be complied with by the members of the Association."

Advice has been received that the Imperial Government will not control the seed situation this year; the Association is therefore making the best possible arrangements for the disposing of Canadian seed in Ireland and France.

REGULATIONS PROTECTING BIRDS

Regulations, which will give the municipal and provincial authorities wider powers in taking steps to protect birds in Ontario, have been passed by the government under the "Birds Protection Act, 1918." The Dominion government sometime ago adopted similar regulations, and the adopting of them by the Ontario government makes the law uniform.

It is provided under these regulations that it shall not be lawful to shoot, destroy, wound

catch, net, snare, poison, drug, expose for sale, or destroy the nests of any wild native birds other than goshawks, sharp-shinned hawks, great-horned owls, crows, cow-birds, blackbirds, (Grackles), house sparrows, and game birds, as mentioned in the Ontario Game and Fisheries Act.

Permits to kill any birds, which under extraordinary conditions may become seriously injurious to the agricultural or other interests in any particular community may

be issued by the Minister of Game and Fisheries. Permits may also be granted to any ornithologist or student of ornithology of biologist, or student of biology empowering the holder to collect and to purchase or exchange all birds or eggs, otherwise protected, at any time or season the same may be required for purposes of study. However, permits so issued shall only continue in force

until the end of the calendar year in which they are issued.

An order in council has also been passed, at the request of the County Council of Elgin, providing that partridge, quail, black and grey squirrels may not be destroyed within that municipality for a period of three years from October 30, 1919.

BETTER SIRES, BETTER STOCK

The United States Department of Agriculture, through the board of animal industry, announces a nation-wide crusade to improve the quality of the live stock through the use of pure bred sires. The following statements outline the general policies adopted for conducting the campaign:—

The elimination of scrub pure-bred sires, as well as common scrubs of mixed breeding, will receive emphasis.

Feeding and care are fully as important as good breeding, and the department does not encourage ownership of well-bred live stock by persons unwilling or unable to give such stock competent care.

The emblem is an official recognition of meritorious desire and effort in live-stock improvement, but is not a guaranty of the quality of live stock.

Emphasis will be placed on individual benefits to be derived from a more efficient production rather than on an increased number of animals.

The campaign urges replacement of scrub fires by good pure breeds, but does not urge pure-bred live stock of both sexes on the average American farm. Whether pure-bred females should be kept is a matter of individual judgment.

Farmers who do not care to take part in the crusade of live stock improvement are requested to let their children do so.

The work is to be conducted through organizations already existing and through such new ones as may arise locally to meet future needs. County agents, extension workers, breeders, and other have signified their support. An invitation is extended to

all persons in the United States, who keep any kind of domestic live stock, to take part in the campaign. These are asked to enroll by filling out the form supplied by the Department of Agriculture at Washington. This form provides for entering the kind and number of animals kept for breeding and a statement of signification that from the date of signing the blank only pure bred sires of good quality will be used. Three ways of distribution are provided and are termed the long way, the medium way, and the short way. In the long way the enrolment blank is to be signed by the live stock owner and further signed by the county agent or a similarly authorized person or two disinterested persons who have examined the stock, then again by an extension director or other college official. It is then forwarded to the United States Department of Agriculture when the official emblem is sent back through the same channel in the opposite direction to the breeder. The medium plan is similar to plan one except that the emblem is sent direct to the live stock owner. In the short way the enrolment blank is sent by the live stock owner and also, either by the county agent or two disinterested persons who have examined the live stock. It is then sent to the United States Department of Agriculture and the emblem is sent direct to the owner.

The machinery by which pure bred sires will be distributed is the farm bureau, farm council, or live stock associations. In counties where none of these exist the organization of such bodies is encouraged.

AYRSHIRE CLUBS IN CANADA

BY W. F. STEPHEN, HUNTINGDON, QUE.

Several years ago, Ayrshire breeders in the Menie district, near Campbellford, Ontario, believing that co-operation was a good thing for a community, got together and organized a club. Its purpose was to further Ayrshire interests by the promotion of good fellowship, by the holding of public sales at auction, by encouraging the entry of cows and heifers in the record of performance test, discussing the best methods of breeding, rearing and exhibiting, thus raising the standard of excellence of the breed, to bring before the public the good qualities and exceptional merits of the breed, and in other ways to generally widen and extend the

interests of this breed of cattle, and to act in unison upon all occasions which demand it. With such an object in view this club did splendid work and the breeders of Ayrshires increased in that district. The organization of other clubs followed, and splendid work for the breed has been done.

The following are the Ayrshire clubs in Canada and their officers:—

MENIE DISTRICT CLUB

President: Alex. Hume, Campbellford, Ont.

Vice-Pres.: E. A. McCook, Campbellford, Ont.

Secretary: W. E. Tummon, Crookston, Ont.

Secretary (acting): S. H. Shannon, Cloverdale, B.C.

SOUTHERN COUNTIES CLUB

President: Frank H. Harris, Mount Elgin, Ont.

Vice-Pres.: J. L. Stansell, Straffordville, Ont.

Secretary: John McKee, Norwich, Ont.

BROCKVILLE CLUB

President: W. M. Bass, Newboro, Ont.

Vice-Pres.: A. Henderson, Athens, Ont.

Secretary: A. J. Hudson, Lyn, Ont.

ALBERTA CLUB

President: A. H. Trimble, Red Deer, Alta.

Vice-Pres.: W. L. Centre, Innisfail, Alta.

Secretary: Rowland Ness, DeWinton, Alta.

BRITISH COLUMBIA CLUB

President: S. H. Shannon, Cloverdale, B.C.

Vice-Pres.: E. A. Wells, Sardis, B.C.

HOWICK-HUNTINGDON CLUB

President: Jas. Bryson, Brysonville, Que.

Vice-Pres.: R. R. Ness, Howick, Que.

Secretary: Gilbert McMillan, Huntingdon, Que.

DUNDAS-GRENVILLE CLUB

President: Elgin Montgomery, South Mountain, Ont.

Vice-Pres.: Prof. W. J. Bell, Kemptville, Ont.

Secretary: S. D. Thorpe, South Mountain, Ont.

BEDFORD DISTRICT CLUB

President: W. F. Kay, M.P., Phillipsburg, Que.

Vice-Pres.: James Davidson, Montreal, Que.

Secretary: Walter M. Wallace, Warden, Que.

QUEBEC BEEKEEPERS' ASSOCIATION

During the past season there has been considerable activity among the beekeepers of Quebec province. Among the resolutions passed at the regular conference of beekeepers were the following recommendations, which were made to the government of Quebec:—

1. That more power be given to foul brood inspectors in the exercise of their duties.

2. That the importation into the province of hives, and all infected beekeeping appliances be prohibited.

3. That the use of hives with stationary

frames in districts affected with foul brood be prohibited.

4. That permission be given to include the inspectors' reports with those of the conference.

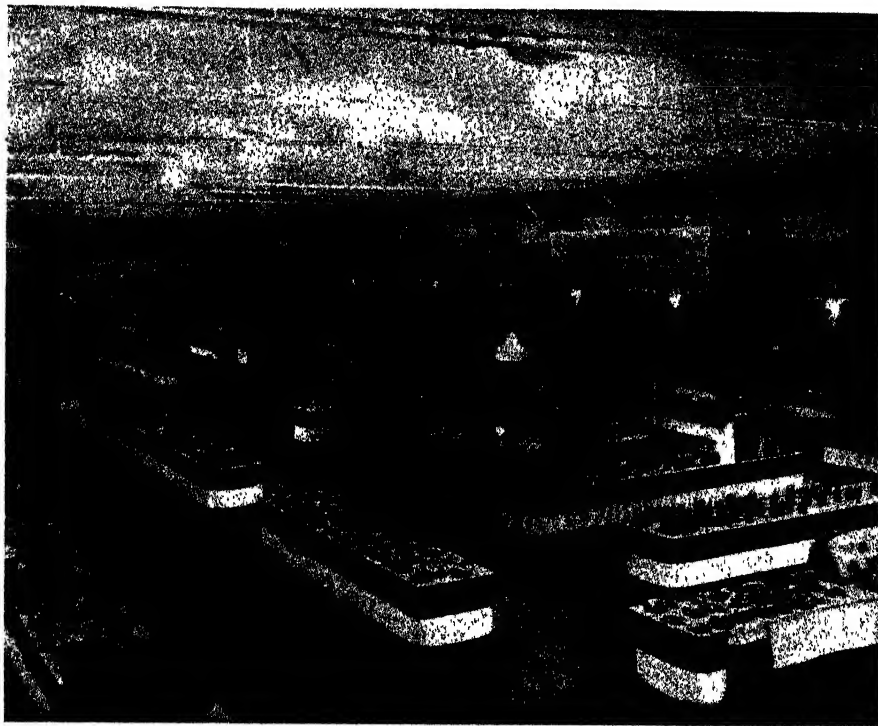
5. That certain reports of the society, which are of general use, be printed at the cost of the government.

6. That certain hives be chosen in the province to be used as demonstration hives where young people can go to get free training and that the government vote a sum for this purpose.

WINNIPEG GARDEN SHOW

The third annual Winnipeg Garden Show was held from September 1 to 5. It was held under the auspices of the Greater Winnipeg Board of Trade. The committee of management consisting of representatives from all the local horticultural societies was presided over by F. W. Brodrick, professor of horticulture at the Manitoba Agricultural College. The secretary is Mr. L. E. Murray. In addition to several classes of fruits, vegetables and flowers, all of which were of unusually fine quality, special exhibits of flowers were made by the agricultural college, the Winnipeg Parks Board, the Brookside cemetery, and the local florists. The Greater Winnipeg water district supplied a table of vegetables. The Tuxedo Military Hospital

made a table of both flowers and vegetables. Competitive tables of vegetables were arranged by the St. Vital Agricultural Society, the Weston Agricultural Society, the Elmwood Cottagers' Gardening Association, the St. Andrews' Agricultural Society, the Souris and Glenwood Agricultural Society and the Morden Agricultural Society. Among the individual competitive exhibits were those of vegetables, fruit, flowers, honey, and canned goods. Other exhibits which attracted considerable attention were those of Manitoba-grown apples and other fruits, many of which were of good marketable size. The show was financially supported by the province, the city and the Board of Trade.



GENERAL VIEW "THE WINNIPEG GARDEN SHOW" HELD IN THE AUDITORIUM, BOARD OF TRADE BUILDING, WINNIPEG, MAN., SEPT. 1-5, 1919

SASKATCHEWAN VETERINARY ASSOCIATION

The annual summer school of the Saskatchewan Veterinary Association held at the University of Saskatchewan was attended by over sixty veterans from all parts of the province.

The following officers were chosen:— President, Dr. J. S. Gibson, Govan; vice-president, Dr. J. M. Fawcett, Saskatoon; registrar, Dr. R. G. Chasmar, Hanley.

ALBERTA WINTER FAIR

CLASSES FOR BOYS AND GIRLS

The Alberta Winter Fair management has made provision for generous prizes to be competed for by boys and girls in classes of sheep, cattle and swine, at the fair to be held December 9, 12, 1919. The competitions are open to girls and boys, resident in Canada, under seventeen years of age, on the last day of the exhibition. The animals may be pure bred or grade, and are not required to be owned by the exhibitor. Exhibitors must have fed, cared for, and fitted his or her entry from October 10 to the date of shipment to the exhibition and must personally exhibit the entry in the sale ring or pen. The exhibitor is required to have personally cared for the animal and attended to all the finishing touches. Allowance is

made for a limited period of illness. In the section for Alberta bred lambs shown by boys or girls, \$400 is offered in fifteen prizes ranging from \$75 for the first prize to \$5 for the fifteenth. In the competition for baby beef, steers, and heifers, \$2,275 are offered and in addition a number of special prizes, consisting of watches and medals. Specials of \$50 each are offered by the Canadian Aberdeen Angus Association, the American Aberdeen Angus Association, the Alberta Aberdeen Angus Association, the Alberta Hereford Breeders' Association, the Canadian Hereford Breeders' Association and the Alberta Shorthorn Breeders' Association for animals sired by the males of the breeds represented by these associations. The Dominion Shorthorn Breeders' Association contributes \$150 for exhibits sired

by Shorthorn sires. Other specials have been provided by individuals. In the open class the money will be divided pro rata according to the actual number of animals shown in each class according to the following plan; 1st, 17 per cent; 2nd, 15 per cent; 3rd, 13 per cent; 4th, 11 per cent; 5th, 9 per cent; 6th, 7 per cent; 7th, 5 per cent; 8th, 5 per cent; 9th, 4 per cent; 10th, 4 per cent; 11th, 3

per cent; 12th, 3 per cent; 13th, 2 per cent; 14th, 2 per cent.

In the section for swine shown by girls and boys sections are provided for bacon pigs under a year and thick hogs under one year. Six prizes ranging from \$15 to \$3 are provided here. A large percentage of the prize money offered in these competitions was contributed by private individuals.

KAMLOOPS BEEKEEPERS' ASSOCIATION

At a recent meeting the organization of the Kamloops District Beekeepers' Association was completed. The officers elected for the current year are,—President, Wm.

McLeod, St. Paul's; vice-president, J. W. Austin, Heffley Creek; secretary-treasurer, J. W. McNab, Kamloops.

NEW PUBLICATIONS

DOMINION DEPARTMENT OF AGRICULTURE

Evidence Taken Before the Select Standing Committee on Agriculture and Colonization during the Session of 1919, printed by order of the Dominion parliament, contains a full report of the evidence taken relating to the agricultural industry according to the following subjects: "Crops and Markets for 1919", "Control and eradication of bovine tuberculosis". "How our live stock can best be improved and a permanent industry built up". "Prospects and markets for 1919". "Canada's transportation, refrigeration and cold storage requirements in connection with possible and necessary development of live stock". "The necessity for government terminal elevators in Ontario". "How can the benefit of using good seed and the best method in crop production be brought home to the average farmer". "The standardization of parts of vehicles and agricultural machinery".

LIVE STOCK BRANCH

NEW PUBLICATIONS.

The Annual Report of the Live Stock Branch for 1918, issued by the Ontario Department of Agriculture, contains the reports of co-operative shipments of pure bred live stock and the Ontario stallion enrolment board, as well as the financial statement of the

Ontario Provincial Winter Fair for 1918, and addresses delivered at the annual meetings of the live stock associations.

NOVA SCOTIA

The Fifty-fifth Annual Report of the Fruit Growers' Association in Nova Scotia contains an account of the proceedings of the annual meeting held in Bridgetown, N.S., January 21, 22 and 23, 1919. It gives in full the addresses of the different speakers together with the financial report for the year.

QUEBEC

Bulletin No. 47 Rabbit Raising, issued by the Department of Agriculture of the province of Quebec gives complete information regarding the raising of rabbits, treatment for their maladies, and contains reliable recipes for the preparation of various dishes.

MISCELLANEOUS

The Manitoba Grain Growers' Year Book, 1919, contains full information regarding both the men's and women's departments of this association, along with the report of the proceedings of the annual convention held at Brandon in January, 1919. In it is also included a directory which indicates sources from which first hand information of value to agriculturists of the province may be secured.

NOTES

The gardeners' and florists association of Ontario at their meetings has adopted the feature of having a member of the society present synopses of magazines and journals devoted to the florist trade.

Neil Sangster of Ormstown, Que., has been elected president of the Holstein Friesian Association of Canada for the remainder of the year in place of the Hon. Dr. S. F. Tolmie, whose resignation as president was accepted by the executive.

A shipment of pure bred live stock has been purchased in Iowa and other states by Professor Austin A. Dowell for the University of Alberta farm. Some well bred animals, winners at several state fairs, are included in this shipment.

In Manitoba good progress is being made in beekeeping. At the end of 1918 the province had 921 beekeepers with approximately 15,000 colonies of bees. The industry here is developing fast as it was only in 1916 that a start was made, sixty beginners then entering the field.

Mrs. V. S. MacLachlan has been appointed Secretary of the Women's Institutes for the province of British Columbia. This appointment has been rendered necessary by the increasing volume of business being transacted by this department of the government at Victoria.

Miss Helen J. Macdougall, formerly of the Department of Agriculture of Manitoba, has been appointed Superintendent of Women's Institutes in the Province of Nova Scotia. Miss Macdougall succeeds Miss Jennie A. Fraser who has for several years been the Superintendent of Nova Scotia Women's Institutes.

James Neilson, B.S.A., Fruit Assistant in the Horticultural Branch of the Ontario Agricultural College, has left his post to take a post-graduate course in pomology at the Iowa Agricultural College. Under Professor Beach, Mr. Neilson will give special study to the subject of grafting fruit trees.

The new professor of biology, Dr. A. E. Cameron, whose appointment to the staff of the University of Saskatchewan was announced in the October number of The Agricultural Gazette, holds the degrees of M.A., D.Sc., (Aber.), M.Sc., (Vict.). Dr. Cameron

has now entered on his new duties in the Saskatchewan University at Saskatoon.

Arrangements are being made to begin a special course of agricultural training for returned soldiers in one of the provincial farm schools in Alberta. It has been decided by the Alberta Department of Agriculture that the Vermilion school will be given over for the use of the soldier students and it is hoped that the classes will be under way early in November.

Mr. D. A. Campbell, for several years principal of the Ottawa Technical School, has been appointed Director of Technical Education of the Province of Alberta. Mr. Campbell will in the beginning act as adviser and will superintend the laying out of the plans for the new technical school in Calgary, both as regards building and teaching in the various branches of the work.

Mr. J. W. Gibson, Director of Elementary Agricultural Education in the Department of Education of British Columbia, accompanied by Mr. J. C. Ready, who is associated with Mr. Gibson as District Supervisor of Agricultural Instruction, have made a tour through the United States and Canada securing ideas that will be made use of in developing a policy for an improved system of rural schools.

In the months of July and August thirty Ayrshire cows qualified in the Canadian Record of Performance. Sixteen were mature, four were four-year olds, three three-year-olds, seven two-year olds. During the same two months thirty-five Holstein cows and heifers were accepted for entry in the official record of merit, while in the semi-official record twenty-eight Holstein cows and heifers qualified in the yearly Record of Performance.

INDEX TO PERIODICAL LITERATURE

The Canadian Countryman, Toronto, Ont., Sept. 13.

Construction and Use of Hydraulic Ram. R. R. Graham, B.S.A., Lecturer in Physics, Ontario Agricultural College, Guelph., page 3.

Economical Fattening of Poultry. M. A. Jull, Professor of Poultry Husbandry, Macdonald College, Que., page 4.

Sept. 20.

Seven Electric Lights for Canadian Dairymen. H. H. Dean, Professor of Animal Husbandry, Ontario Agricultural College, page 3.

Harvesting Red Clover for Seed. John Fixter, Supervisor, Illustration Stations, Central Experimental Farm, page 4.

Repairing the Stables. John Evans, Professor of Manual Training, Ontario Agricultural College, page 4.

Sept. 27.

Seven Electric Lights for Canadian Dairymen. Professor H. H. Dean, page 5.

Oct. 4.

Cutting and Harvesting Corn for Silage. John Fixter, page 5.

Oct. 11.

How to Protect Your Building from Lightning. R. R. Graham, B.A., B.S.A., page 3.

Spontaneous Combustion. Dr. Frank T. Shutt, Dominion Chemist, Ottawa, page 5.

Oct. 18.

How to Obtain Maximum Winter Egg Production. M. A. Jull, page 4.

Harvesting Roots. John Fixter, page 5.

- The Canadian Horticulturist*, Peterboro, Ont.
Oct.
Orchard Insects in Ontario in 1919. L. Caesar, Associate Professor of Entomology, Ontario Agricultural College, page 241.
Gathering and Storing Vegetables. A. Richardson, Department of Horticulture, Ontario Agricultural College, page 247.
Notes on the Fruit Situation. Dominion Fruit Division, Ottawa, page 250.
- The Canadian Poultry Journal*, Hamilton, Ont.,
Oct.
What the Ontario Agricultural College is Doing as an Institution. Professor W. R. Graham, Professor in Poultry Husbandry, Ontario Agricultural College page 297.
Ontario Agricultural College Great Memorial Hall. Professor Wade Toole, B.S.A., Animal Husbandry Department, Ontario Agricultural College, page 301.
- The Canadian Poultry Review*, Toronto, Ont.
Oct.
Poultry Diseases. M. C. Herner, B.S.A., Professor of Poultry Husbandry, Manitoba Agricultural College, Winnipeg, page 438.
- The Canadian Thresherman and Farmer*, Winnipeg, Man.
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Leguminous Crops on the Prairies. T. J. Harrison, B.S.A., Professor of Field Husbandry, Manitoba Agricultural College, page 36.
Vigorous Seed Potatoes for Better Yields. W. T. Macoun, Dominion Horticulturist, page 38.
Fertilizers and Their Use in Canada. Frank T. Shutt, M.A., D.Sc., page 40.
- The Farm and Home*, Vancouver, B.C.
Sept. 18.
Possibilities of Small Fruits on Vancouver Island and the Lower Mainland are Good. E. H. White, District Horticulturist, page 3.
Some Advice to Prospective Beginners in Pure Bred Stock. H. Barton, Professor of Animal Husbandry, Macdonald College, page 5.
Anthraxnose of Apple Trees. J. W. Eastham, Provincial Plant Pathologist, page 7.
- Oct. 2.
Contagious Abortion in Cattle. C. D. McGilvray, M.D.V., Principal, Ontario Veterinary College, Toronto, page 5.
- The Farmer's Advocate and Home Journal*, Winnipeg, Man.
Sept. 10.
Getting Into Pure-Breds. H. Barton, B.S.A., page 1447.
- Sept. 17.
Our Opportunity in European Markets. H. S. Arkell, Dominion Live Stock Commissioner, page 1483.
- The Farmers' Magazine*, Toronto, Ont.
Sept. 15.
Surveying Our Farm Crop Situation. C. A. Zavitz, Professor of Field Husbandry, Ontario Agricultural College, page 5.
Is the Price of Dairy Products Too High? Professor H. H. Dean, page 40.
- The Grain Grower's Guide*, Winnipeg, Man.
Sept. 10.
Shall I Keep Sheep? J. McCaig, M.A., Chief Publicity Commissioner, Department of Agriculture, Edmonton, page 9.
- Sept. 17.
Steps in Butter-Making. R. W. Brown, Professor of Dairy Husbandry, Manitoba Agricultural College, page 14.
Arrangement of Poultry Houses. M. C. Herner, page 58.
- Oct. 8.
Common Breeding Practices. A. A. Dowell, Professor of Animal Husbandry, University of Alberta, Edmonton, South, page 9.
- The Journal of Agriculture and Horticulture*, Quebec, Que.
Oct. 1.
Rotations and Their Value. R. Summerby, Professor of Cereal Husbandry, Macdonald College, page 64.
Nitrate of Soda. Its Nature and Use in Agriculture. Frank T. Shutt, M.A., D.Sc., page 67.
- Littlebury's Magazine*, Calgary, Alta.
Sept.
Canadian Prairie Hawks and Agriculture. P. A. Taverner, Geological Survey, Mines Department, page 21.
- The O.A.C. Review*, Guelph, Ont.
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The Rural School and Its Relation to the Present Period. J. B. Dandeno, Ph.D., Inspector, Elementary Agricultural Classes, page 19.
The Improvement of the Rural Home Surroundings. T. G. Bunting, Professor of Horticulture, Macdonald College, page 22.
- Rural Canada*, Toronto, Ont.
July.
Calf-Raising—How it is Done Most Economically. E. S. Archibald, Dominion Animal Husbandman, Ottawa, page 25.

PART V

The International Institute of Agriculture

FOREIGN AGRICULTURAL INTELLIGENCE

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SCIENCE AND PRACTICE OF AGRICULTURE

CROPS AND CULTIVATION

Electrical Stimulation of Crops.—BIRKS, L. AND DAVIS O'D., in *The Journal of Agriculture, New Zealand Department of Agriculture, Industries and Commerce*, Vol. XV, No. 4, pp. 185-190, Wellington, October, 1917.

New Zealand possesses large supplies of hydro-electric power and is in a particularly favourable position to apply this power to cultivation. Preliminary experiments have been made at Christchurch. The first was carried out in a greenhouse 80 ft. x 30 ft. in which 1,400 tomato plants were set out. The house was fitted with lamps, hung 2 ft. from the ground, which were kept alight from 9 p.m. till 5 a.m. As the plants grew the lamps were raised, until they were finally covered by the tops of the plants. At the beginning of the experiments the steam-pipes had gone out of order and many plants had been injured by a severe frost before the heating apparatus could be repaired. The plants recovered rapidly and gave a very heavy crop, ripening relatively earlier than those of another glasshouse, where the plants, which were not attacked by frost, were grown under similar conditions but without lighting at night.

A second experiment was carried out to test the possibility of protecting fruit trees against frost by means of 250-watt radiator lamps suspended in the centre of the tree, near the fork, and turned on during the nights when frost was to be feared. Three rows of 8 trees each were used for the experiment, one of pear-trees and two of mixed apples. The radius of action of the heat of the lamp was found to be approximately 1 ft. below the lamp, 4 ft. above it, and 3 ft. all round it horizontally. There were many frosts, two of which were very severe. Electric heating did not appear to have any effect on the pear trees, but the apple trees gave a heavier crop and ripened fully a fortnight earlier than those which were not heated by electricity.

The cost of installing electricity for stimulating crops in glasshouses is not prohibitive, working out at about 10 to 20 per cent of the actual present capital and interest and depreciation cost of the glasshouse. The use of electricity for stimulating plant growth would be very valuable, especially for early crops.

Sugar Beet Seed in France.—SAILLARD, E., in *Comptes Rendus de l'Académie des Sciences*, Vol. 165, No. 16, pp. 508-510. Paris, 1917.

Stating that approximately 5,000,000 kg. (about 5,500 tons) of sugar beet seed was used annually in France before the war and that approximately four-fifths of this seed was of foreign origin, the author briefly reviews experiments begun in 1904 to compare French-grown seed with German-grown seed. During the war the seed was practically all of Russian and French origin. For the 10-year period of 1904 to 1913, inclusive, weekly analyses of the beets grown in the comparative tests were made at 14 sugar beet factories beginning about August 1. In 1905 French seed produced approximately 140 kg. per hectare (125 lbs. per acre), less sugar than German seed and the beets showed approximately 0.9 per cent less sucrose. At the present time it is claimed that production is practically the same, although beets from French seed analysed from 0.3 to 0.4 per cent less sucrose than those from German seed. Further observations were made of the sugar-beet crop during 1916 and 1917 by means of analyses made at nine factories, although the variety tests had to be discontinued. The average weekly results obtained from these two sets of analyses are presented in tabular form, showing the weight of roots lifted, the percentage of sucrose, amount of sugar in roots lifted, and sugar produced per hectare and per root per week.

It is concluded that the beet crop was practically as rich in sugar in 1916 and 1917 as for the 10 years preceding the war. For

the 10-year period a maximum production of sugar of 569 kg. per hectare and 7.95 gm. per root was obtained the first week in September, while in 1916 and 1917 the maximum production was reached about the third week in September and amounted to 653 kg. per hectare and 9.92 gm. per root.

A New Fertilizer, "Superphosphate of Ammonia".—BRIOUX, C., in *Comptes Rendus de l'Academie d'Agriculture de France*, Vol. IV, No. 21, pp. 632-638. Paris, 1918.

A method of using superphosphate to absorb ammonia is described, and the fertilizing value of the neutral product thus obtained is discussed. The product obtained by this process in the experiments here reported contained 15.8 per cent of phosphoric acid, 14.1 per cent of which was soluble in 2 per cent citric acid, and 4.97 per cent of ammoniacal nitrogen.

Peat Soil Qualities.—DUNNEWALD, T. J., in *Journal of American Society of Agronomy*, October, 1917, pp. 322-324, Lancaster, Pa.

Under the drainage law of the State of Wisconsin, the author has examined an area of about 6,600 acres of marshes and swamps to find out whether a favourable or unfavourable condition would be found in different areas and whether the vegetation would, as claimed by practical farmers, give an indication of such conditions, such claim declaring black spruce or moss-covered swamps not good for cropping. The author considers his experiments to confirm the farmers' statements that trees, such as ash, elm, birch, white pine, show a better quality of peat than that on which grow only black spruce or tamarack, sphagnum moss, blueberries, and cassandra, and that peat bearing black spruce and tamarack has 20 per cent less mineral matter and a much higher degree of acidity and somewhat less nitrogen.

Studies on Nitrification in Natural Soils and its Importance from an Ecological Point of View in Sweden.—HESSELMAN, H., in *Skogwardsforeningens Tidskrift*, Year XV., No. 4-6 pp. 321-446, Stockholm.

The author distinguishes between two kinds of humiferous soils, one type being described as well aerated by the action of worms and insects and as characterizing deciduous forests and to a lesser degree pine forests on soils rich in inorganic salts, while the other type, comprising dead, decomposed, or decomposing vegetation, is said to occur in ordinary pine forests and frequently to form a series of layers of varying stages of decomposition clearly defined from the mineral subsoil. Studies were made with soils from different types of forests, and included an examination of the soil samples for nitrifying bacteria, tests of the nitrifying capacity of the different soils, and determinations of the nitrogen content of trees and plants growing on the various soils

at different seasons. Conclusions were reached as follows:—

The humus of beech woods contained as many nitrifying as denitrifying bacteria distributed throughout the mass, while samples of this soil formed considerable amounts of nitrates. On the other hand, the humus of pine forests with a mossy covering was characterized by the absence of denitrifying organisms and bacteria capable of nitrifying ammonium sulphate. No potassium nitrate was found in the tissues of plants growing on this soil.

It is stated that the isolation of organic substances from the soil said to be partly toxic to plants should not be over-emphasized, as no proof is available that such substances occur in the dark-coloured, acid humus of coniferous forests.

In many places nitrification was so rapid that considerable amounts of nitrogen accumulated in the covering vegetation, this being specially marked in dense beech, elm, oak, ash, and alder forests with moving underground water. In the higher mountain regions the soil covering contained a large quantity of nitrogen, while in woodlands and spruce forests with grassy soil coverings the nitrogen of the humus nitrified without a resulting accumulation of nitrogen in the layer. Plant associations on bare rocky soils were often composed of nitrophilous species, which accumulated nitrogen in their tissues. In pine forests having a covering of lichens and mosses, nitrification did not occur, and the decomposition of the dead covering gave rise to the formation of ammonia and its compounds. Natural soils were capable of accumulating as much nitric nitrogen as ordinary cultivated soils.

Nitrification was found to be influenced not only by the origin of the soil to a large extent but also by the climate. Since the degree of nitrification constituted an important factor in determining the composition of the plant associations of a given soil, those factors affecting the formation of the soil might have a decisive influence on this composition. A suitable forest system, therefore, should make it possible to thin the forests in such a way as to favour soil nitrification, thus assuring a higher yield of wood. It is stated, however, that good yields of pine and spruce could be obtained on soils having no nitrate formation. In the latter case, the rate of growth appeared to be proportional to the rate of ammonification.

LIVE STOCK AND BREEDING.

Fish Meal as a Food for Live Stock.—CROWTHER C., in *Journal of the Board of Agriculture*, August, 1919, p. 482-484, London, England.

In Scandinavia and elsewhere on the Continent fish meal has been found very useful in the feeding of horses, cattle, sheep, pigs and poultry. In Great Britain its use for pigs is now widespread and increasing, whilst

recent experiments indicate that it forms a satisfactory food for calves.

Horses.—Fish meal has been fed with satisfactory results to horses up to an amount of 2 lb. per head per day. The fish meal must be given in admixture with other foods and introduced very gradually into the diet, otherwise very great difficulty may be experienced at first in securing satisfactory consumption. It should be particularly useful when supplies of good hay are scanty and much straw is consequently fed.

Cattle.—Fish meal has been used with satisfactory results, to the extent of 2 or 3 lb. per head per day by Scottish cattle feeders. Difficulty has been experienced in some cases in securing satisfactory consumption at the outset, but with a little ingenuity in blending the foods this is soon overcome. The richness of fish meal in albuminoids marks it out as a particularly suitable supplement to a diet of roots and straw.

Milch Cows.—Experiments in Scandinavia and elsewhere have demonstrated that fish meal can be fed to dairy cows to the extent of 4 lb. per head daily or even more without imparting a fishy taint to the milk. In view of the special requirements of milch cows for albuminoids, fish meal would thus appear to be distinctly useful for milk production. Its use under the conditions of average farm practice, however, must always involve a risk of direct contamination of the milk through the agency of the milker rather than that of the cow, especially where the milker has occasion to handle the foods before milking. Only where the greatest care is taken to avoid such contamination can the use of fish meal for milch cows be recommended, but, if the necessary precautions are taken and a limited proportion of fish meal, say not exceeding 3 lb. per head per day, is fed, no undesirable consequences need be feared.

Calves.—For calf-rearing purposes the richness of fish meal in albuminoids and "bone phosphate" must be regarded as particularly advantageous. In recent experiments on the rearing of calves on whey and meal mixtures satisfactory results have been obtained with mixtures containing fish meal.

In experiments at Kilmarnock in 1916 and 1917 the following mixtures were used:—

- (1) Oatmeal 2 parts, fish meal, 1 part.
- (2) Fine thirds, 2 parts, fish meal, 1 part.

In experiments carried out at Reading in 1918, under the auspices of the Board of Agriculture, the following mixtures containing fish meal were included in the tests and gave satisfactory results:—

- (1) Linseed meal, 3 parts, bean meal, 3 parts, fish meal, 1 part.
- (2) Linseed meal, 3 parts, fish meal, 1 part.
- (3) Linseed meal, 3 parts, finely ground oats, 3 parts, fish meal, 1 part.

In the Kilmarnock experiments the meals were fed in the form of a porridge, but in the

Reading experiments they were consumed in a dry state, at the rate of 1 lb. meal per gallon of whey. Although these mixtures were specially intended for use with whey, there is no reason why similar mixtures should not do equally well for other conditions of calf-rearing. Fish meal used for calf-rearing should be of the best quality, and finely ground.

Sheep.—Fish meal is a useful supplementary food for sheep on roots, and may be given at the rate of 2 to 3 oz. daily per 100 lb. live weight, in admixture with pulped roots or other food. It should be particularly useful for ewes in milk.

Pigs.—Experiments conducted by the Seale-Hayne Agricultural College, the University of Leeds, and the West of Scotland Agricultural College have all confirmed the view, which is steadily gaining ground in practice, that fish meal is an excellent feeding-stuff for pigs. In the Leeds experiments in which fish meal formed from one-ninth to one-seventh of the total dry food, rising in the last month to more than 1 lb. per head daily, no detrimental influence upon the appearance, colour, smell or cooking qualities of the meat could be detected. It is to be hoped, therefore, that bacon factors will take a more tolerant view than has prevailed in some quarters in the past as to the suitability of fish meal for pig-feeding under proper conditions.

In purchasing fish meal for pig-feeding it is necessary to ensure that the meal does not contain more than a very small percentage of salt, or detrimental results may ensue.

Poultry.—Fish meal is now largely used in poultry-feeding and gives good results where the necessary precautions are taken. It is desirable that the fish meal should be introduced gradually into the diet and that the proportion used should not exceed one-twentieth of the whole diet in the case of chickens, or one-tenth in the case of adult fowls. It may be used rather more liberally for ducks.

The necessity of avoiding a salty meal referred to in the case of pigs is even more important in the case of poultry.

Pork Production in North Dakota.—PETERS W. H., AND GEIKEN, D. J., in *Dakota Experiment Station, Bulletin*, 127, pp. 253-278, Agricultural College, N.D., 1918.

This bulletin discusses briefly some of the more important phases of swine management, points out the value of certain crops for pasturing swine, and reports the results of a number of feeding trials, giving numerical data in tabular form.

The average results of all the station's trials with feeding grain alone to hogs in the dry lot are considered as indicating that under these conditions of feeding it takes about $4\frac{1}{2}$ lbs. of grain to make 1 lb. of pork. It was shown also that it is more difficult to keep pigs in good health and to produce a

good firm quality of pork under these conditions than when the pigs are kept on pasture.

From the results of feeding experiments in 1916 and 1917 with pigs on alfalfa pasture it is concluded that alfalfa is the most successful pasture crop for hogs, and that a ration of $3\frac{1}{2}$ lbs. of grain per 100 lbs. of live weight of pigs per day fed to young growing animals on alfalfa pasture produces better and more uniform hogs, and also gives a larger profit than either a lighter or heavier grain ration. In a trial in which the pigs were pastured on sweet clover, it was found that this crop did not prove very palatable to them. Canada field peas at the station were not found satisfactory for providing summer pasture. At the Edgeley Substation in 1917 four acres of field peas pastured by 100 pigs during the greater part of August produced a gain of 1,750 lbs., which, at 12 cents per lb. gave the field an acre value of about \$52.50. Hogging off Canada field peas when mature proved practical and profitable. Hogging off the early maturing varieties of corn through the fall months was also found advantageous. Feeding good alfalfa hay to brood sows in winter made possible a saving of from $\frac{1}{4}$ to $\frac{1}{2}$ of the grain that otherwise would have been required.

The Nesting Habits of the Hen.—TURPIN, G. M., in *Iowa Experiment Station Bulletin* 178, pp. 209-232. Ames, Iowa, 1918.

This bulletin reports the results of experiments and observations made to determine the important factors influencing hens in selecting the place for laying their eggs. Data for March and April, and April and May showing the regularity in time of nesting are presented in tables, together with other records.

Of the hens under observation as to the diurnal time of laying 17.7 per cent laid before 9 a.m., 28.5 per cent from 9 to 11 a.m., 27.3 per cent from 11 a.m. to 1 p.m., 19.5 per cent from 1 to 3 p.m., and 7 per cent from 3 to 5 p.m. Nesting records showed that a large percentage of hens adhere closely to a uniform schedule of daily egg production and the time of day of laying. Hens laying regularly every other day were found to lay about the same hour each day, and those laying two days in succession in every three-day period as a rule laid the first egg of the cycle at a certain definite hour of the forenoon and the second during a definite period in the afternoon. Most of the hens laying three eggs in a cycle laid the first egg comparatively early in the forenoon, the second somewhat later in the forenoon, and the third at a definite period in the afternoon. In general hens laying more than three eggs in a cycle laid a larger proportion of their eggs in the forenoon than those laying a smaller number in a cycle. It was observed that hens usually visited a number of nests and spent some time on them before selecting the nest in which they finally laid.

The average time spent on the nest in laying was found to be 1 hour and 35 minutes for each of two tests with White Leghorns, 1 hour and 45 minutes and 1 hour and 49 minutes, respectively, for two tests with Rhode Island Reds, and 2 hours and 16 minutes in one test with White Plymouth Rocks. The time the hens spent on nests when not laying brought the average per egg produced up to about two hours. The proportion of the total time spent on the nest before and after the egg was actually delivered varied greatly, but no correlation was apparent between the rate of egg production and the average length of time spent on the nest in laying. Hens frequently visited the nests and spent considerable time there on days when they did not lay.

Nests appeared much more attractive to the hens when they contained at least one egg, and became less attractive as the number of eggs was increased to more than three or four. In three tests to determine the value of nest eggs, the numbers of eggs laid in the first test in nests furnished, respectively, with no nest egg, china egg, and hen's egg, were in the ratio 100:198:269; in the second test with no nest egg, glass egg, hen's egg, and wooden egg the ratio was 100:160:184:233, and in the third test with no nest egg, hen's egg, wooden egg, and plaster of Paris egg, 100:194:208:221.

The relative number of eggs laid in concealed and exposed nests was respectively, 113 and 100. In one test 91.7 per cent and in another 87.6 per cent of all eggs produced were laid in concealed nests with nest eggs, compared with exposed nests without nest eggs. Habit did not appear as a strong factor in determining the particular nest in which the hen choose to lay from day to day. It is stated that at least one nest for every four or five hens is required to meet the needs of the average farm flock.

FARM ENGINEERING

The Gas Tractor in Eastern Farming.—YERKES, A. P., and CHURCH, L. M., in *United States Department of Agriculture Farmers' Bulletin* 1004, pp. 27. Washington, D.C., 1918.

This publication summarizes detailed reports received from over 250 experienced tractor owners in New York State during 1917 and the spring of 1918. The operating conditions upon which the reports were based were rolling country with a comparatively stony loam soil and heavy clay subsoil. Very diversified farming was practiced on all farms reporting, at least half a dozen different field crops being grown. More than one-third of the entire acreage was devoted to hay.

The reports indicated that the greatest advantage of the tractor lies in its ability to perform the work in a shorter time than when horses are employed. The saving in man labour was considered next in import-

ance, and the ability to do better work in ploughing and preparing the soil was placed third. Under disadvantages the reports indicated the inability to use the tractor satisfactorily until the top soil is well dried. On heavy soil packing of moist soil resulted, and unsatisfactory work on hilly and rough land, especially in stony fields, was frequently the case. It is noted that 84 per cent of the cases reporting indicated that the tractor was a profitable investment, and of this number over one-third increased the acreage farmed.

With reference to the size of outfit the general conclusion is drawn that the 2-plough tractor does not possess in an adequate degree the greatest advantage of tractors in general, and that the 3-plough tractor is distinctly the favourite among owners of farms of 151 or more crop acres. The reports indicated an annual repair charge during the first three years of use of a tractor on New York farms of nearly 4 per cent of the first cost. It is thought that this will increase during later years of operation.

The area covered per day of ten net working hours in ploughing with the tractors used on New York farms was 4.5 and 6.25 acres for the 2- and 3-plough outfits, respectively. The average cost per acre ploughed for gasoline, oil, and grease was about 99.5 cents where gasoline was used, and 49 cents where kerosene was used, with an allowance of 2 cents per acre for gasoline used in warming up. The approximate costs of ploughing an acre with 2- and 3-plough tractors, based on average costs of \$775 and \$1,050, respectively, and a life of 8½ years of 54 working days per year, are given as \$2.26 and \$2.06, respectively, for gasoline and \$1.76 and \$1.56 for kerosene. The average life of a tractor is estimated to be not longer than 8½ seasons from the practical standpoint. Other general data are reported.

AGRICULTURAL INDUSTRIES

The Beet-Sugar Industry in the United States.—TOWNSEND, C. O., in *United States Department of Agriculture Bulletin* 721, pp. 56. Washington, D.C., 1918.

This bulletin comprises a detailed discussion of the subject dealing with the distribution of the crop in the United States; soil and climatic adaptations; field practices and cultural methods employed in growing sugar beets; irrigation, drainage, and seepage on sugar-beet lands; the maintenance of soil fertility in sugar-beet production; crop rotations for sugar beets and crops competing with sugar beets; farm equipment, including live stock and labour; sugar-beet by-products and live stock production; labour problems; the successful grower; diseases and insects affecting the crop; roads; contracts between growers and sugar companies; competition between adjacent sugar-beet areas; and sugar-beet seed production.

Celery Storage Experiments.—THOMPSON, H. C., in *United States Department of Agriculture Bulletin* No. 579, pp. 26, 10 figs. Washington, September 5, 1917.

Celery growing is of great importance in the United States. The farm value of the crop in 1909 was \$3,922,848, but, as a considerable portion of this is stored for one to three months, its commercial value is much superior to the farm value given.

This value may be increased by good storage methods. The old methods are gradually being given up more and more in favour of cold storage. In spite of this, celery is so difficult to store that many warehouses prefer to devote themselves to other products.

Very few data on the cold storage of celery are available. The experiments carried out by the United States Department of Agriculture during 1912-1915 aimed at determining: (1) The factors which hasten decay in celery in storage houses. (2) The best methods of reducing the loss of celery in storage due to decay and mechanical injury. (3) The best type of crate in which to pack celery to be cold-stored. (4) The effect of the temperature of the storage room on the keeping quality of celery.

The experiments were carried out in three cold storage warehouses, Elmira, Hornel and Williamson, N.Y.

Large crates are favourable to decay, which begins in the centre. Injury to celery is chiefly due to the breaking of the crates.

The celery suffered less injury when packed in smaller crates and in those with a longitudinal or transversal ventilation partition down the centre. The 14-inch crate gave the best results, followed by the 16-inch crate and the 11-inch crate. The standard crate varies in size from 22 to 24 by 24 inches. Small crates, though slightly more expensive than large ones, are preferred by many cold storage warehouses because it is easier to handle them and the proportion of broken crates is smaller.

A market test showed that celery stored in small crates sells for a much higher price than that in standard crates handled in exactly the same way. The crates were piled up in five tiers. The celery in the top tier was decayed in a larger proportion than that in the lower tiers.

There was a greater difference in the keeping quality of the celery in the different tiers in standard crates than in the other crates. The difference in the keeping quality of the celery in the different tiers is probably due to the difference in temperature of the room at different heights. The temperature of the air at the fifth tier averaged 2.4°F. more than that of the first tier. The temperature of the celery in standard crates averaged 2.7°F. higher at the fifth tier. The temperature of the celery in the standard crate averaged 2°F. higher than in the partition crate and 4.1° higher than the air at the same height.

In order to check properly the temperature of the room, thermometers should be placed at different heights. In many cases, when the temperature at 4 feet from the floor was 32°F., that near the ceiling was found to be from 35 to 36°.

Grape Syrup.—BIOLETTI, F. T., and CRUESS, W. W., in *California Agricultural Experiment Station Bulletin* 303, pp. 227-242. Berkeley, Cal., 1918.

This is a preliminary report of investigations conducted for the purpose of determining whether a grape syrup can be made that will be bought for its special properties, and whether such a syrup can be produced and sold at prices that will attract the consumer and pay the grower. A method for manufacturing the syrup based on the experimental work reported is as follows:—

Ripe grapes, preferably 25° Balling and higher, are crushed and pressed in the ordinary winery equipment as soon as possible after picking. The juice from the pomace is extracted by progressive washing with boiling water and steam and two supplementary pressings. The liquid from the first extraction is mixed with the undiluted juice, and that from the last extraction is used for the first extraction of the next lot of pomace. To 100 gallons of juice 1.25 lbs. of liquid sulphurous acid or 2.5 gallons of 6 per cent acid solution are added to prevent fermentation, and the juice is then stored in clean, completely filled, and lightly bunged wooden tanks. If stored for some time before being sent to the sugar factory, a sediment forms from which the clear juice can be drawn off and shipped in clean, sterilized barrels. At the sugar factory the juice is desulphited with steam, clarified, if necessary, with casein or a mixture of casein and Spanish clay, decolorized with bone black, filtered, deacidified with calcium carbonate, filtered again, concentrated to 65° Balling in triple-effect vacuum pans, and allowed to settle for two weeks in clean tanks to remove excess of calcium tartrate. The clean syrup is then packed in containers, pasteurized for from 25 to 35 minutes, and cooled in water.

This process is said to yield a syrup of agreeable taste and flavour which can be used as a table syrup, in cooking, canning, and in making certain preserves. Attempts to use it in the preparation of jellies and marmalades were not successful. It is said that by slight modifications of the process special syrups can be made of different colours and flavours.

Estimations of the yield and cost of the syrup indicate that if practically all the juice were extracted a ton of grapes would yield a number of gallons of 65° Balling syrup equal to two and one-half times the Balling degree of the juice, and that the cost of the syrup would be about \$1.35 per gallon.

Drying Vegetables in Denmark.—DUNNE, J. J., in *Better Business*, Vol. IV, No. 2, pp. 121-123, Dublin, 1919.

During the closing years of the war no fewer than 20 factories have been engaged in drying vegetables and herbs in Denmark. Some of these factories existed before the war, but most of them have been recently erected. When 100 lbs. of each of the following comestibles have been subjected to the drying process, there remains—of red and white cabbage, 9 lbs.; of green cabbage, 15 lbs.; of Swede turnips, 18 lbs.; of potatoes, 15 lbs.; of carrots, 12 lbs.; of leeks, 7 lbs.; of leek-tops, 20 lbs.; of root-celery, 13 lbs.; of stalk-celery, 15 lbs.; of parsley, 15 lbs. The factories put up the dried vegetables in cardboard boxes, like flake-oatmeal. Dried white cabbage (drumhead) is retailed at the rate of 60 cents per lb. Six packets go to make up the lb., and each packet contains a ration sufficient for three persons, and is retailed at 10 cents.

Most of the factories are capable of drying from 60 to 80 tons of raw vegetables in 24 hours. The factory has three shifts of men, and runs continuously. The fuel used is turf, both black and brown. The managers of the factories say that turf is better adapted to the work than coal. It takes 25 tons of turf to dry 70-80 tons of vegetables. Some of the vegetables are dried for home consumption, but a good deal have been exchanged with the neighbouring countries, Sweden, Norway and Finland, for other commodities that Denmark lacks. Large quantities of potatoes and swede turnips have been dried. The advantages of drying such comestibles are: (1) Dried potatoes, roots, vegetables and herbs keep for three years. (2) Convenience and economy with regard to handling, transit and storage. A ten-ton wagon can accommodate 7.5 tons of dried potatoes, that if raw would require five 10-ton wagons. (3) The evaporation of the water-content of the comestibles in question diminishes their bulk and weight so much that the economy in freight and storage is very great. (4) Turf may be used for drying the vegetables with excellent results.

One of the vegetarian specialties put on the market by these factories is dubbed "Julienne Soup." It consists of certain percentages of swede turnips or potatoes and white cabbage, green cabbage, celery, parsnips, leeks, parsley and carrots. The potatoes are washed, peeled and dried. The remaining vegetables are washed and dried, and the whole is chopped fine and mixed. The retail price of the ingredients from which the soup is made is 85 cents per lb. It is put up in fancy packets, at 14 cents each. Six packets weigh one lb.

Relation of Dehydration to Agriculture.—PRESCOTT S. G., in *United States Department of Agriculture, Office of the Secretary, Circular* 126, pp. 11. Washington, D.C., 1919.

This is an address before the National Association of Commissioners of Agriculture at Baltimore, Md., January 8, 1919. It contains a brief history of food drying, with particular reference to the stimulation of the drying industry by war, and a description of the dehydrating systems in the United States.

The methods now in use are classified as follows: (1) The tunnel systems, which consist of long chambers or tunnels into which the prepared vegetables are introduced on screens or racks and through which a strong current of dry heated air is blown. (2) kilns, which consist essentially of square chambers with sloping roofs and perforated floors, heated from below by means of stoves or furnaces, (3) the vacuum process, employing closed chambers with a large number of shelves heated by steam at greatly reduced pressure, and (4) special machines so arranged as to bring about a carefully regulated drying. With the first two methods, a lack of uniformity in the products is likely to result, owing to the fact that there is not absolute control of the physical conditions. The vacuum process is considered to give excellent results for many kinds of products but tends to break down the cellular structure of the material. It is pointed out that only in those processes where there is practically perfect control of temperature, humidity, and rate of air flow are products obtained which will retain their flavour, colour and appearance, and, when soaked in water, will return to approximately their normal appearance.

The most important advantages of dehydration, from the standpoint of agriculture, are considered to be the stabilization of crops and the conservation of food materials. A third factor of importance is that a better diversity of crops can be secured, as a result of which there will be a good variety of vegetables available to all classes throughout the year.

New Methods for the Analysis of Butter.—

ERCULISSE P. and DACKWEILER H., in *Annales de Chimie Analytique*, Vol. 23 No. 11, pp. 225-234. Paris, 1918.

The customary determinations in the examination of butter are described and criticised. As substitute determinations, there are proposed the index of saponification, the silver index, and the magnesium index, these being respectively the number of milligram molecules contained in 1 gm. of fat, of fatty acids, butyric acid, and caproic, caprylic, and capric acids. From these values can be calculated the true Reichert-Meissl, Polenske, and Hehner numbers.

The saponification index is obtained in the usual manner of determining the saponification number. The silver index is obtained by precipitating a known amount of neutral soap by silver nitrate, which precipitates everything but butyrate. The index is then determined by comparison with the saponification index. The mag-

nesium index is obtained by precipitating a new amount of neutral soap by magnesium sulphate, which leaves in the filtrate only those acids with fewer than 12 carbon atoms (with the exception of butyric acid). These are then precipitated with N silver nitrate.

The methods, which are described in detail, are said to be more rapid and accurate than the customary determinations, and to be capable of application to the analysis of all kinds of fats and their derivatives, such as soaps.

Important Invention for Treatment of New Milk for Export.—DUNNE, J. J., in *Better Business*, Vol. IV, No. 2, pp. 119-120. Dublin, 1919.

The Federation of Danish dairies has turned its attention to the export of new milk to those belligerent countries in which the exigencies of war have greatly diminished the stock of dairy cattle. The principal drawback with regard to the export of new milk is that it will not keep for any protracted period, especially in summer. This difficulty has been surmounted. A young mechanic living in the city of Aarhus invented a process of milk treatment which enables the milk to keep for months. Exported in specially constructed transport cans, the flavour and nutritive qualities of the new milk are fully retained. The process consists in a subdivision of the fat-particles in the milk, which precludes the possibility of cream gathering on the surface. In other words, the milk is rendered homogeneous, and this treatment is followed by sterilization. The dairies are about to be reorganized and equipped, with a view to making milk export their principal business. As the Central Powers need all the milk Denmark can export, Germany will now become Denmark's chief customer for this article. The Federation of Danish dairies has bought the invention from an Aarhus company for £4,500, and have also secured the services of the inventor. A factory at Aarhus has been bought for the purpose of turning out the machinery essential to the equipment of those dairies that lie in close proximity to the railway lines. These dairies will concern themselves mainly with the work of milk-export, whilst the dairies that lie at a greater distance from the railway lines will concern themselves chiefly with the making of butter, cheese, etc.

During the last five or six years the sale of cream in Denmark has undergone a peaceable revolution through the introduction of homogenized sterilized cream in bottles. The process consists of the breaking up of the fat-globules in the cream by subjecting it to steam pressure in a special machine and then bottling it. The bottles are afterwards placed in an oven and subjected to a sterilizing process. The cream thus treated keeps for an unlimited period. When the cork is removed in the summer it will become sour in the course of 24 hours, but as long as

it is kept corked it will remain sweet, winter or summer. The bottles for summer use are smaller than those used in winter. They vary in size from a glass to half-a-pint or a pint. At present half-a-pint of 8 per cent to 9 per cent cream is retailed at 14 cents including the cost of the bottle; before the war the same quantity was sold for 6 cents. Of late the trade in bottled cream has assumed enormous dimensions. Several firms are engaged in the business, and many new firms are taking up the idea. The preserving system is the same as that described in the preceding section.

The cream was originally put on the market as export cream, but the fact is that the home market demand for the cream exceeds the export requirements very considerably.

Cooling Milk and Storing and Shipping it at Low Temperatures.—GAMBLE, J. A., and BOWEN, J. T., in *United States Department of Agriculture, Bulletin* 744, pp. 28. Washington, D.C., 1919.

The experimental work reported deals with the efficiency of cooling devices of various constructions and in different locations and the value of insulation on cans used for storage and transportation purposes, with special reference to prompt cooling at the farm. The cooling devices dealt with are tanks containing ice and non-circulating water, into which cans of milk are placed.

Reports received from some 40,000 dairies in 32 States indicate that about 80 per cent of farms producing market milk use some sort of cooling tank. About 19 per cent of the tanks were metal, 25 per cent of wood, 31 per cent of concrete, and 25 per cent of material not specified. Very few tanks were insulated.

Cooling in a tank is at an end when milk and water are of uniform temperatures. In an ideal tank permitting no absorption of outside heat, the end temperature is a weighted average of the initial temperatures of water, milk, can, and milk, the weights being proportional to the specific capacity of each substance to absorb heat. The measure of tank efficiency proposed is the ratio (expressed as percentage) of this theoretical temperature to the actually observed end temperature, the latter always being higher owing to radiation from the surroundings. Directions are given for constructing a concrete tank with insulating substances imbedded in the walls that is 97 percent efficient.

Experimental tanks were constructed of uniform size to test the relative efficiency of four different materials, when tanks are either sheltered or unsheltered from the sun, covered with a wooden lid, or uncovered. Hourly changes in temperature in the tanks during the progress of experimental cooling are shown by graphs, while the heat absorbed expressed as British thermal units and the relative loss in cooling effects expressed in pounds of ice are given in tables. In the order of increasing efficiency the materials

used were galvanized iron, solid concrete 4 to 5 inch thick, 1 inch wood not insulated, and 1 inch wood lined with 2 inch of cork. The results show clearly the value of a simple board covering and the importance of having the tank indoors, the logical place being the milk house. The added expense of insulation in most cases would soon be compensated for in the saving of ice. In building a tank it is recommended that it be divided into a larger and a smaller compartment so as to allow the economical cooling of different quantities of milk. A tank holding 3 or 4 gallons of water for each gallon of milk is more efficient in the use of ice than a larger tank. When the water supply is of low temperature, pre-cooling results in economical use of ice and rapid lowering of the temperature of the milk to 50° F. Rapid cooling is also greatly aided by putting ice in the tanks some time before the cans of milk are added.

Six 10-gallon cans were used to study methods of holding and transporting milk. Insulated cans (kind of insulation not mentioned) held milk at a low temperature considerably longer than any of the other kinds. The can covered with a 1-inch jacket of felt held milk cool as long as a can with an ice compartment and several times as long as a plain can. The same cans filled with milk cooled below 45° F. were sent on long railroad journeys, from Washington, D.C., to New Orleans and from Chicago to Washington. Temperature changes in the milk were noted at frequent intervals. The results are shown graphically in a series of charts. The insulated and felt covered cans were the most satisfactory in retaining a low temperature.

654—The Refrigerated Meat Industry in South America.—MIDDLEBROW, in *El Campo*, No. 25, p. 5-7, Buenos Aires, November, 1918.

According to semi-official estimates there were in 1918 in Argentina, 27,050,000 cattle and 44,850,000 sheep, but the author believes these estimates to be much too low. The great development of cattle-raising in Argentina is due to the growing of alfalfa. In 1895 that forage plant was cultivated only on 1,750,000 acres while in 1918 it was grown on over 22,000,000 acres. In 1913 the total value of animal products was \$193,000,000 or 40 per cent of the value of the total exports of the country, while in 1917 the value of the animal products amounted to \$363,000,000 or 68 per cent of the total exports.

The exports of meat from Argentina remained about constant in quantity from 1911 to 1915; in 1916 there was an increase of 32 per cent over 1915; in 1917 they amounted to 559,216 metric tons.

In 1914, 13,000 tons of meats preserved by cold were exported from Argentina, in 1917, 100,000 tons, and in 1918 about 150,000 tons. The consumption of refrigerated meats in Europe in 1913 was 46,000 tons; in 1917 it was 415,000 tons. In 1917 the world's pro-

duction was 965,000 tons distributed as follows: South America 540,000, Australia 119,000, New Zealand 117,000, Canada 55,000, South Africa 22,000, United States and other countries 112,000 tons.

In the refrigerating establishments of Argentina 15,000 cattle and 25,000 sheep are slaughtered per day, and 30,000 workmen are employed.

North American companies have installed vast refrigerating establishments in Brazil, Uruguay and Paraguay. In Uruguay 141,000 animals were slaughtered by these establishments in 1913 against 528,000 (about half of the total production) in 1917. During the first 7 months of 1915 Brazil exported only 6 tons of preserved meats, while during the same period in 1918 she exported 10,000 tons. In Paraguay there are 3 large meat refrigerating establishments.

INJURIOUS INSECTS

Derris as an Insecticide.—McINDOO, N. E., SIEVERS A. F., and ABBOTT, W. S., in *Journal of Agricultural Research*, August 15, 1919, pp. 177-200. Washington, D.C.

Derris, known widely as a powerful East Indies fish poison, was found to fulfil several of the requirements of a general insecticide; it acts both as a contact insecticide and as a stomach poison, but is of no practical value as a fumigant. Six species of Derris were tested, but only two of them (*elliptica* and *uliginosa*) were found to be satisfactory for insecticidal purposes.

According to the views of various authors, the toxic principle in Derris is a resin, which affects various classes of animals according to the development of their nervous systems. It kills some insects easily and others with difficulty, but it usually acts slowly and seems to kill by motor paralysis.

Denatured alcohol was found to be a good economic solvent for extracting the toxic principle, which when applied in spray mixtures proved to be efficient against certain aphids, potato-beetle larvæ, and small fall webworms. For proprietary insecticides it is possible to incorporate the extracts from Derris into soft soaps which when greatly diluted with water are ready for use.

Derris powder, used as a dust under practical conditions, was found to be efficient against dog fleas, chicken lice, house flies, three species of aphids (*Aphis rumicis* L., *Aphis pomi* De Geer, and *Myzus persicae* Sulz.) potato-beetle larvæ, and small fall webworms, but of no practical value against bedbugs, roaches, chicken mites, mealybugs, *Orthesia insignis*, red spiders, or against the crawling young of the oyster-shell scale. Used as powder in water with or without soap under practical conditions, it proved to be efficient against most of the aphids sprayed and also against cabbage worms (*Autographa brassica* Riley), the larvæ of apple datanans (*Datana ministra*, Dru.), oak worms (*Anisota senatoria* S. and A.) small tent caterpillars, and potato-beetle larvæ.

Physical Properties Covering the Efficacy of Contact Spray.—MOORE, W., and GRAHAM, S. A., in *Journal of Agricultural Research*, June 10, 1918, pp. 523-538.

It was considered by Shafer that the vapour of contact insecticides such as kerosene, gasolene, creolin, and pyrethrum were responsible for the death of insects to which these materials were applied. It was therefore assumed as a working basis that the volatility of organic compounds, which has previously been shown to be an index of the toxicity of their vapours to insects, would also be an index of the toxicity of these compounds when used as contact sprays. In working with insect eggs, however, it was found that materials not sufficiently volatile to kill insects or their eggs by their vapour within a reasonable length of time, were among the most effective materials when applied to the eggs as liquids. Further studies in which different fractions of kerosene were used revealed the fact that the least volatile fractions were the most effective as contact insecticides, while they failed to kill insects which were exposed only to their vapour.

With these results in mind it was considered advisable to determine the physical properties governing the entrance into the insect of a contact insecticide, and wherein this differs from the penetration of the vapour.

From the general results reported in the article here reviewed it appears that the physical properties as well as the chemical properties have an important bearing upon the efficiency of the contact spray. Even though the spray may contain a very active poison, it will not be effective unless it conforms to certain physical requirements—that is, the ability to vaporize and penetrate in the form of a vapour or to spread over the insect and penetrate the liquid form. The results reported by McClintock, Houghton, and Hamilton show very clearly that this is true. The results in the use of quassia with or without soap as reported by McIndoo and Sievers are another example, and it is a common observation that the addition of soap to nicotine sprays increases their efficiency. The following are some of the principles which must be kept in mind in studying the effects of contact insecticides.

(1) Contact insecticides may be divided into two groups: (a) Those which spread over the body of the insect and penetrate the tracheæ. (b) Those which are not able to spread over the insect and do not penetrate the tracheæ. (2) Contact insecticides which are either soluble in ether or chloroform or are fat solvents are able to spread over the insect and enter the tracheæ. (3) The rate of spread of these insecticides is governed by their viscosity and cohesion. (4) Compounds with a viscosity as high or higher than castor oil spread so slowly that in general they may be classed as poor insecticides. (5) Compounds more volatile than xylene

evaporate too quickly for effective work. (6) Sprays in the form of emulsions may enter the tracheæ as such, or the oil remaining after the emulsions are broken down may spread over the insect and enter the spiracles. (7) Relatively non-volatile oils penetrate the body of the insect directly through the walls of the tracheæ as liquids, the rate depending upon the viscosity. (8) Volatile oils may penetrate the walls of the tracheæ in either vapour or liquid form. (9) Sprays which are unable to enter the tracheæ in liquid form may penetrate and pass through the tracheal walls as vapour. (10) Fumigants gain entrance and pass through the tracheal walls in vapour form. (11) Slightly volatile compounds tend to condense upon the tracheal walls, owing to the fact that small quantities are sufficient to saturate the atmosphere. Owing to this high saturation, these condensations tend to penetrate the chitin rather than to re-evaporate. Volatility is an index of the ability of the compound to gain entrance into the insect and is therefore closely correlated with toxicity.

Orchard Spraying Versus Dusting.—GIDDINGS, N. J., in *West Virginia Agricultural Experiment Station Bulletin* 167, pp. 18. Morgantown, W. Va., 1918.

This bulletin reports a series of experiments conducted during a period of five years in both apple and peach orchards to determine the value of dust treatments as compared with ordinary methods of spraying. The peach dusting experiments are described

in detail, and a brief general statement is given of the work with apples. The detailed results with apples are to be reported at a later date.

Sulphur dust was found quite effective against peach scab and brown rot. The dust treatments have also been found very effective for the control of biting or chewing insects. It is believed that the dusting method may be of much practical value in peach orchards.

After four years of experimental work it is not felt that the dusting method is to be recommended in West Virginia apple orchards where scab or sooty blotch is severe, or for the treatment of bitter rot, black rot, or blotch, unless it is used primarily for the control of insects, such as codling moth, curculio, cankerworm, or caterpillar. In apple orchards where it is difficult to use a spraying machine, or where it is difficult to obtain water, the dusting method will be of considerable benefit for insect control.

The cost of materials required for efficient dust applications is considerably greater than for sprays. Relative to labour and time required, however, it was found that one man and a driver with a dusting outfit can dust between three and four times as many trees per hour as two men and a driver can spray with the ordinary power-spraying outfit. With the spraying outfit it was customary to handle two rows at a time and short but frequent stops were necessary. The dusting machine usually covers three rows at a time and the team is kept moving at a good walk.

AGRICULTURAL ECONOMICS

CO-OPERATION IN THE NEW WORLD ¹

BY LIONEL SMITH-GORDON. (FROM "BETTER BUSINESS", AUGUST 1919)

The idea, firmly established until recently that no genuine co-operative movement exists in America, is ill-founded. The temperament of the American people is widely different from that of Europe, and it has been a natural result of this fact that the movement has developed on what we should regard as somewhat unorthodox lines. As was pointed out in previous articles, the distributive form of co-operation as practised in England makes very little appeal to the American workman, although there are signs that since the pressure of war conditions has been fully felt the situation in this respect is somewhat changed. Similarly, except in Quebec, among the foreign population of some American cities and in the more backward parts of the country there is no scope for the credit societies which in many European countries are the foundation of the movement. Thus American co-op-

eration has been to a large extent built up upon agricultural supply business on the one hand and the marketing of produce on the other. Owing, however, to the very large extent of the farms and the bulk of the supplies which they are in a position to purchase throughout the greater part of the country it has been easy for a few American farmers, acting together, to purchase all they require by the wagon-load without going to the trouble of forming themselves into a registered co-operative society with a regular manager. Naturally, however, this work has been more and more concentrated in the hands of the secretaries of the various farmers' associations which exist in all states of the Union and in practically every county, and are federated in the great central bodies such as the Grange and the Farmers' Union. I have already pointed out that the existence of these bodies, whose primary objects were political and social, tended to make more difficult the establishment of a

¹This, which is the last of a series of ten articles, sums up the author's views on the subject.

pure type of co-operative society. We have always to bear in mind—and that is a point of which the doctrinaire enthusiast is liable to lose sight—that the chief object of the co-operative form of organization is the satisfaction of a definite demand; if this is achieved, the actual method adopted is of only secondary importance. We cannot, therefore, be surprised or aggrieved that we do not find in America the small agricultural distributive societies of the type that have played an important part in the work of the Irish co-operative movement. Their place has been more than filled, both socially and economically, by the bodies I have described.

In the sphere of collective marketing, however, there is little doubt that American co-operators are considerably ahead of those of any other country. There is something in marketing on a large scale and in a business-like manner which apparently makes a great appeal to the American temperament, and it is a noticeable fact that whereas many of the most successful co-operative societies in other lines have been built up by immigrants who were accustomed to the same methods in Europe, those which have been most successful in the marketing of fruit are mainly the work of native Americans. It has been claimed by some observers that the operations of these societies are merely an example of successful collective action done in a business-like way, and that there is little or no co-operative idealism associated with them. In most cases I do not think that suggestion is warranted, and the best proof of this is that among those associations which call themselves co-operative there are certain ones which are not so either in fact or in intention, and these at once impress themselves on the inquirer as being different from the others. This at once suggests that the normal type bears the distinguishing marks of the co-operative spirit. Thus in my own experience I found that I was uniformly received with the utmost politeness and hospitality and all my enquiries fully and frankly answered even by the busiest officials, except in one or two instances. In these exceptional cases I found always, on careful investigation, that the society was not in fact co-operative, and was simply sheltering under the name and reputation in order to make more profit out of the growers.

The chief criticism one would be inclined to offer of the movement as a whole in the United States is its weakness in regard to federation. With the exception of the societies which are organized round a central selling agency, as is usual in California, it may be said that each one stands on its own feet. This is particularly noticeable in the case of the creameries of Minnesota and Wisconsin, which would seem to have everything to gain by acting together in the purchase of their requirements and the manufacture and sale of their product. Yet all

efforts to bring about any common action in these cases appear to have been unavailing. Similarly, although there exist one or two agencies in connection with the various farmers' organizations throughout the Middle Western States which are purchasing in large quantities for the members of local societies or associations, there are practically no such things as wholesale societies created and managed as federations of local co-operative bodies.

Not only does this seem to weaken the power of the movement from the purely material point of view, but it brings with it of necessity a weakness in respect of educational and propagandist work, and also of supervision, which is an undoubted handicap to the movement. To a very large extent the early successes and the rapid development of co-operation in Europe were due to the enthusiasm and vigour of the federations, which made themselves responsible for the work of existing societies and undertook the organization of new ones. The work of such bodies was done for the most part by men of disinterested enthusiasm, such as Raiffeisen and Sir Horace Plunkett, followed as the movement grew by a staff of trained officials who combined practical efficiency and experience with a very real idealism. In this type of work America, partly owing to the size of the country and partly owing to conditions of development and the intensely pioneering type of the inhabitants, has been a long way behind. As a consequence each society has evolved its own methods, and in such matters as bookkeeping and auditing, which in Europe are usually supervised by the federations, there is often a great deal to be desired. Exceptional men—of whom we may instance Messrs. Paulhamus of Puyallup, Krumrey of Sheboygan and Powell of Los Angeles as types, though there are doubtless many others—are to be found directing co-operative activities with both practical and spiritual success, but their work is almost of necessity confined to a small area, and, as a rule, to one particular organization.

What one would look forward to seeing in America would be the development of the "general purposes" type of society which would cater for the whole needs of the community. In many ways the smaller towns and country villages of the States are particularly suited to this form of organization, and we have seen how such places as Svea, under the influence of Scandinavian immigrants, have succeeded in bringing it to a remarkable pitch of perfection. But such societies require to have more than an isolated existence in order to fulfill the purposes of the movement. Some connecting link is needed, both for educational purposes and for advantageous trading. It is difficult to see how this can be provided on a national basis, in view of the tremendous size of the country and the divergent conditions prevailing in different parts of it. The

attempt of the National Agricultural Organization Society, to which I alluded in the first article of this series, to meet the need has encountered this difficulty from the outset. The only way to meet it would be to start by forming organizations for each State, or, if necessary, for even smaller units—possibly counties—and gradually bring these federations together into larger and larger combinations. It remains to be seen whether or not men will arise who are willing to give the necessary time and money—and both will be required in generous measure—to such work. If so, they will have a beginning to hand in the work which has already been done by the small band of practical enthusiasts whom I have mentioned. It should be noted that since the United States joined in the war the N. A. O. S., together with a number of other powerful bodies of farmers, joined forces in a central committee, with headquarters in Washington, under the name of the National Board of Farmers' Organizations. Much useful work has been done by this body in looking after the interests of the farmers, and very successful Congresses have been held. It would seem that when normal conditions are restored the members of this body should be in a good position to attack the problem of intensive organization on co-operative lines throughout the States. One cannot help feeling, however, that there is a tendency here, as in so many other cases, to overlook the drudgery of constructive work on a small scale in favour of the more sweeping policy which can be based on newspaper publicity and semi-political resolutions. In fact it is hard to escape from the conclusion that co-operation is, in practically every case, the child of sheer necessity, and that no great stimulus can be given to it from without until the need for it forces itself upon the attention of the people locally affected.

At the same time it is quite clear that America badly requires a centre of information to which all who have an interest, either practical or theoretical, in the co-operative movement can go for advice and assistance. Until some such centre is available there will be a great deal of unsatisfactory work done in the name of co-operation, and a great deal left undone which, with a little encourage-

ment, might have the best of results. For this reason it is greatly to be hoped that, if no more definite work is done by the national board, it will, at least, bring into existence a permanent bureau for the purpose of advising farmers as to co-operative developments.

One point remains to be touched upon—the possibilities of America in regard to international co-operative action, particularly in regard to trade. I have already pointed out that the co-operative marketing which is done in the United States is done not only exceedingly well but on a very large scale, and this fact is an important one for co-operators of other countries to bear in mind now that the idea of exchange of goods is being freely mooted. There seems to be no reason why a very large part of the fruits despatched to Europe by co-operators in California, Florida and elsewhere should not pass through co-operative channels the whole way to the consumer; and if this could be brought about, and a certain amount of the products of the Co-operative Wholesale Society of Manchester could be sent out in exchange, the first steps would already have been taken towards the establishment of an international wholesale society such as many co-operators earnestly look forward to. In Russia the idea of such developments has already been keenly taken up, and it is noticeable that the Russian co-operators appear to look to America and England as their principal allies. They have had large and well-staffed offices in both countries for some time past, and friendly relationships are firmly established.

On this subject a word of warning may perhaps be permitted, although it is somewhat outside the scope of these chapters. There appears to be a danger that more than one type of international organization may spring up, and that in the creation of these alliances political and other considerations may be allowed more weight than purely co-operative interests. The fact cannot be too strongly emphasized that co-operation knows, or should know, no frontiers; the co-operators of one country must rank equally with those of any other if international action is to preserve any of the true characteristics of the movement.

THE ECONOMIC SITUATION IN EUROPE

STATEMENT AND ANALYSIS BY MR. HERBERT C. HOOVER, DIRECTOR-GENERAL OF RELIEF,
SUPREME ECONOMIC COUNCIL, FROM THE JOURNAL OF THE BOARD OF
AGRICULTURE FOR SEPTEMBER

THE following passages on the economic situation in Europe are extracts taken from a Memorandum prepared by Mr. Hoover for special purposes and not for publication. The Food Controller, however, considered it of such interest that he asked to be allowed to publish it in the *National Food Journal*, the official organ of his Department. Mr. Hoover consented on condition that it was viewed as an analysis and not as a criticism. It is felt that the passages here reprinted from the statement published in the *National Food Journal* for 13th August, 1919, will be of special interest to agriculturists.

The economic difficulties of Europe as a whole at the signature of Peace may be almost summarised in the phrase "demoralised productivity." The production of necessities for this 450,000,000 population (including Russia) has never been at so low an ebb as at this day.

It is not necessary to review at length the causes of this decrease of productivity. They are, in the main, as follows:—

The industrial and commercial demoralisation arising originally out of the war, but continued out of the struggle for political rearrangements during the armistice, the creation of new governments, their inexperience, and friction between these governments in the readjustment of economic relations.

The proper and insistent demand of labour for higher standards of living and a voice in administration of their effort has unfortunately become impregnated with the theory that the limitation of effort below physical necessity will increase the total employment or improve their condition.

There is a great relaxation of effort as the reflex of physical exhaustion of large sections of the population from privation and from the mental and physical strain of the war.

To a minor degree, considering the whole volume, there has been a destruction of equipment and tools, and loss of organization and skill, due to war diversions, with a loss of man-power. This latter is not at present pertinent in the face of present unemployment.

(The demoralisation in production of coal. Europe to-day is an example in point of all these three forces mentioned above, and promises a coal famine with industrial disaster unless remedied. It is due in a small percentage—from the destruction of man-power—to the physical limitation of coal mines or their equipment. It is due in the largest degree to the human factor of the limitation of effort.)

The continuation of the blockade after the armistice has undoubtedly destroyed enterprise even in open countries, and, of course,

prevented any recovery in enemy countries. The shortage in overseas transportation, and the result of uncertainties of the armistice upon international credits, have checked the flow of raw materials and prevented recovery in the production of commodities especially needed for exchange for imports from overseas. The result of this delay has been unemployment, stagnation, absorption of capital in consumable commodities to some extent all over Europe.

From all these causes, accumulated to different intensity in different localities, there is the essential fact that, *unless productivity can be rapidly increased, there can be nothing but political, moral and economic chaos, finally interpreting itself in loss of life on a scale hitherto undreamed of.*

Coincident with this demoralization in production, other disastrous economic phenomena have developed themselves, the principal one of which is that the very large wages paid to special workers, and the large sums accumulated by speculation and manufacture during the war, have raised the standard of living in many individuals from the level of mere necessities to a high level of luxuries. Beyond this class there is a reflex in many other classes from the strenuous economies against waste and the consumption of non-essentials in all countries; and, as a result, there is to-day an outbreak of extravagance to a disheartening degree.

Another economic change, of favourable nature from a human point of view, but intensifying the problems of the moment, has been the rise in the standard of living in large sections of the working classes through the larger and better wage distribution, separation allowances, etc., during the war. Parallel with these classes are those of fixed income, the unorganized workers, and the unemployed, on whom the rising cost of living is inflicting the greatest hardship.

During some short period it may be possible for the Western hemisphere, which has retained and even increased its productivity, to supply the deficiencies of Europe. Such deficiencies would have to be supplied in large degree upon credits. But aside from this, *the entire surplus productivity of the Western hemisphere is totally incapable of meeting the present deficiency in European production if it is long continued. Nor, as a practical fact, could credits be mobilized for this purpose for more than a short period, because all credits must necessarily be simply an advance against the return of commodities, and in exchange, and credits will break down the instant that the return of commodities becomes improbable. Further, if such credits be obtained for more than temporary purposes, it would result in economic slavery of Europe to the Western*

hemisphere, and the ultimate end would be war again.

The solution, therefore, of the problem, except in purely temporary aspects, does not lie in a stream of commodities on credit from the Western hemisphere, but lies in a vigorous realization of the actual situation in each country of Europe and a resolute statesmanship based on such a realization. The populations of Europe must be brought to a realization that productivity must be instantly increased.

The stimulation of production lies in the path of avoidance of all limitations of the reward to the actual producer. In other words, attempts to control prices (otherwise than in the sense of control of vicious speculation) are the negation of stimulation to production, and can only result in further curtailment of the total of commodities available for the total number of human beings to be fed, clothed, and housed.

There still exist in Europe great bureaucrasies created from the necessity of control of price and distribution by the conditions of the war, who are loath to recognize that with world markets open no such acute situation exists, and that their continued existence is not essential except in the control of speculation. The argument so much advanced that world shortage may develop and justifies continued control of distribution and price, is based upon the fallacious assumption that, even if the world markets are freed of restraint, there is a shortage to-day in any commodity so profound as to endanger health and life.

From any present evidence, thanks to the high production outside Europe, no shortage exists that will not find its quick remedy in diminished consumption or substitution of other commodities, through minor alteration and price. All attempts at international control of price, with a view to benefit the population in Europe at the cost of the producer elsewhere, will inevitably produce retrogression in production abroad, the impact of which will be felt in Europe more than elsewhere. A decrease of 20 per cent of western hemisphere wheat would not starve the West; it would starve Europe.

It must never be overlooked that control of price and distribution cannot stop with a few prime commodities, but, once started, its repercussions drive into a succeeding chain of commodities; and that on the downward road of price control there can be no stoppage until all commodities have been placed under restriction, with inevitable stifling of the total production.

It is also often overlooked by the advocates of price control that, whereas the high level of production was maintained during the war even under a restraint of price, this high production was obtained by the most vivid appeal to patriotic impulse on both sides of

the front. This stimulus to production and distribution no longer obtains, and the world must go back to the prime impulse—and that is the regard to the individual producer and distributor.

That body of advocates who have deduced from war phenomena that production and distribution can be increased and maintained by appealing to altruism as the equivalent of patriotism or self-interest should observe the phenomena of Russia, where the greatest food-exporting country is to-day starving.

It must be evident that the production cannot increase if political incompetence continues in blockade, embargoes, censorship, mobilization, large armies, navies and war.

There are certain foundations of industry in Europe that, no matter what the national or personal ownership of control may be, yet partake of the nature of public utilities in which other nations have a moral right. For instance, the discriminatory control of ships, railways, waterways, coal and iron in such a manner as to prevent the resumption of production by other States will inevitably debar economic recuperation and lead to local spats of economic chaos with its ultimate infection abroad, to say nothing of the decrease in productivity. These misuses are already too evident.

The question of assistance from the Western hemisphere during a certain temporary period, and the devotion of its limited surplus productivity to Europe, is a matter of importance and one that requires statesmanlike handling and vision. It is but a minor question compared to those stated above, and it is in a great degree dependent upon the proper solution of the factors already touched upon.

It is a service that the Western hemisphere must approach with a high sense of human duty and sympathy. This service will, however be best performed by the insistence that its aid would not be forthcoming to any country that did not resolutely set in order its internal financial and political situations, that did not devote itself to the increase of productivity, that did not curtail consumption of luxuries and the expenditure upon armaments and did not cease hostilities, and did not treat its neighbours fairly.

If these conditions were complied with, it is the duty of the West to put forth every possible effort to tide Europe over this period of temporary economic difficulties. Without the fulfilment of these conditions the effort is hopeless.

With Europe turned towards peace, with her skill and labour aligned to overcome the terrible accumulation of difficulty, the economic burden upon the West should not last over a year, and can be carried, and will be repaid. To effect these results the resources of the Western hemisphere and of Europe must be mobilized.

AGRICULTURAL STATISTICS

UNITED STATES OCTOBER CROP REPORT

The following table contains the preliminary estimates of the 1919 crops of the United States based on conditions on October 1.

Crop	1919 Preliminary estimate	1918 Final figures
	Bushels	Bushels
Wheat...	918,471,000	917,100,000
Corn....	2,900,511,000	2,582,814,000
Oats....	1,219,521,000	1,538,359,000
Rye.....	84,600,000	89,103,000
Barley..	198,298,000	256,375,000
Flaxseed..	10,652,000	14,657,000
Potatoes .	350,070,000	397,676,000
	Tons	Tons
Hay .	102,000,000	89,833,000

WORLD'S PRODUCTION OF TOBACCO

(From U. S. Department of Commerce, Bureau of Census, Bulletin 139)

The use of tobacco was introduced into Europe shortly after the discovery of America. The cultivation of this plant was soon introduced into a number of European countries and has spread to all parts of the world suited to its culture. In many countries the product is used locally, for the most part, very little of the tobacco entering into commercial channels. This is particularly the fact in certain sections of Asia, Africa, and Oceania, and, to a less degree, in South America. The Dutch East Indies, Brazil, Turkey, and the Philippine Islands are important as exporters.

In order to afford some idea of the production of tobacco in the different countries, the following table has been prepared from such sources as are available. The quantities shown in the table do not represent the actual production of any particular year but rather, an average annual production. Owing to the war in Europe, which has indirectly affected countries located elsewhere, it is impossible to obtain as satisfactory data for the years since the beginning of hostilities as could be secured for an earlier period, say from 1911 to 1913. The quantities shown in the table, therefore, represent a pre-war basis because such figures more nearly approach a normal crop. In a few instances the data refer to exports only, no estimate as to the local consumption being available. It is probable that the greatest degree of uncertainty relates to tobacco growing in China and in British India. Both of these countries grow tobacco very extensively, but practically all of it is consumed locally.

Country	Quantity (Pounds)
NORTH AMERICA:	
Canada	12,500,000
United States (continental)....	1,000,000,000
Porto Rico.....	10,000,000
Cuba.....	75,000,000
Haiti	12,000
Jamaica.....	1,000,000
Santo Domingo....	28,000,000
Mexico	35,000,000
Guatemala.....	1,500,000
British Honduras..	30,000
Salvador.....	750,000
Honduras.....	1,700,000
Nicaragua.....	1,250,000
Costa Rica.....	900,000
SOUTH AMERICA:	
Argentina.....	35,000,000
Bolivia.....	3,000,000
Brazil.....	100,000,000
Colombia.....	20,000,000
Chile	8,500,000
Ecuador.....	1,750,000
Paraguay.....	18,000,000
Peru.....	2,000,000
Uruguay.....	3,000,000
Venezuela.....	8,000,000
EUROPE:	
Austria-Hungary ..	170,000,000
Belgium.....	20,000,000
Bulgaria.....	30,000,000
Denmark.....	250,000
France.....	50,000,000
Germany.....	60,000,000
Greece.....	22,000,000
Italy.....	20,000,000
Netherlands.....	2,000,000
Norway.....	90,000
Roumania.....	20,000,000
Russia (European)....	230,000,000
Serbia.....	7,500,000
Sweden.....	1,600,000
Switzerland.....	1,500,000
Turkey (European).....	15,000,000
United Kingdom.....	200,000

Country	Quantity (Pounds)	Country	Quantity (Pounds)
ASIA:		AFRICA—Concluded	
British India.....	1,000,000,000	Algeria.....	23,000,000
British North Borneo.....	4,000,000	Azores Islands.....	1,000,000
Ceylon.....	25,000,000	Canary Islands.....	100,000
China.....	500,000,000	Mauritius.....	25,000
Dutch East Indies.....	200,000,000	Nyasaland.....	4,500,000
Formosa.....	1,500,000	Rhodesia.....	3,000,000
Japan.....	120,000,000	Tripoli.....	500,000
Indo-China.....	5,000,000	Tunis.....	300,000
Korea.....	35,000,000	Union of South Africa.....	15,000,000
Persia, Beluchistan, Afghanistan, etc.....	20,000,000	Zanzibar.....	500,000
Philippines.....	100,000,000	Other Africa.....	5,000,000
Russia (Asiatic).....	35,000,000	OCEANIA:	
Siam.....	3,000,000	Australia.....	2,000,000
Turkey (Asiatic).....	75,000,000	Fiji and Society Islands, etc.....	100,000
AFRICA:		Hawaii.....	50,000
Abyssinia.....	1,000,000	Total.....	4,196,607,000

LIVE STOCK STATISTICS

ENGLAND AND WALES

Classification	Number on		Increase (+) or decrease (—)	
	June 4, 1919	June 4, 1918	Differences	Percentage
Horses ..	1,386,810	1,375,830	10,980	0.8
Cows and heifers.....	2,553,500	2,577,970	24,470	0.9
Other cattle ..	3,641,090	3,622,520	18,570	0.5
Sheep.....	15,123,220	16,475,180	1,351,960	8.2
Pigs.	1,799,560	1,697,070	102,490	6.0

INDIA

Number of live stock in 1917-18 as compared with 1916-17. Only for Burma, Central Provinces, Bcrar, Ajmer-Merwara

and Manpur Pargana are the figures for the years stated. For the other provinces the figures are from older enumerations.

Classification	Number of head in		Increase (+) or decrease (—) in 1917-18 as compared with 1916-17	
	1917-18	1916-17	Difference	Percentage
Bulls and bullocks...	49,331,497	49,416,156	— 84,359	— 0.2
Cows.....	37,471,164	37,616,899	— 145,735	— 0.4
Buffaloes, Bulls.....	5,582,655	5,581,163	+ 1,492	0.0
Cows ..	13,652,678	13,698,584	— 45,906	— 0.3
Young stock (calves and buffalo calves) ..	43,069,628	43,112,218	— 42,590	— 0.1
Sheep.....	22,894,571	22,923,458	— 28,887	— 0.1
Goats ..	33,165,506	33,366,392	— 200,186	— 0.6
Horses and ponies ..	1,680,946	1,680,990	— 44	0.0
Mules.....	70,940	70,910	+ 30	0.0
Donkeys.....	1,534,344	1,537,083	— 2,742	— 0.2
Camels.....	499,903	500,011	— 108	— 0.0

CANADIAN IMPORTS OF CATTLE FROM GREAT BRITAIN PROHIBITED

Under and by virtue of authority conferred upon him by the provisions of Section 9 of The Animal Contagious Diseases Act, R.S.C., 1906, the Deputy Minister of Agriculture, under date of October 24, 1919, orders that, owing to the existence of foot and mouth

disease in England, all permits for the importation to Canada from the United Kingdom, except Scotland, of cattle, sheep, other ruminants, and swine shall be and are hereby cancelled. The embargo had recently been lifted temporarily.

THE CONDITIONS OF SEED CROPS AND THE SEED TRADE IN THE UNITED STATES

An attempt is being made in the following pages to furnish timely information on seeds in foreign countries. It is hoped that this information will, to some extent enable Canadians to properly appreciate the sources of supply, so as to procure seeds of good quality when they import, and afford them much of the data they need should they be exporters of seeds.

The information which appears in this issue of the Gazette is that at present readily available, and relates primarily to the United States. There is presented the condition of certain seed crops, the seed stocks in the United States, and the farm value of the United States' seeds. The trade reports give details of the sources of supply upon which the United States draw, and of the destination of the seeds which they export.

It is hoped that there will result some timely service and guidance for the Canadian importer and exporting producer.

Saving limited data relating to 1919, the trade figures cover the years from 1914 to 1918. In order to give an idea of the trend of prices and permit of some comparison of the first year of war with the last, the average export and import prices have been calculated for the years 1914 and 1918. This has been done, country by country, and an average of the whole trade for all countries has been calculated besides. Readers are, however, warned to be guarded in interpreting these prices. The wide differences in prices as between the several countries may be the result of different varieties and grades so as not to offer a sound basis for exact comparison.

RED AND ALSIKE CLOVER SEED OUTLOOK IN THE UNITED STATES

(From the U.S. "Seed Reporter")

The prospective production of red clover seed in the United States this year is estimated from numerous reports received about August 22 from correspondents in all of the producing sections to be about 75 per cent that of last year. The smaller production this year is to be accounted for largely by the reduced acreage and the probable decreased yield per acre because of the dry, hot weather that occurred in some of the largest seed-producing sections after the hay crop (first crop) was harvested. In these sections the growth was much retarded by the drouth and the fields that were in flower at the time of making the inquiry (about August 22) did not present the appearance of filling well. In Minnesota and Wisconsin, where sufficient rainfall was obtained at the proper time, the yield per acre is very promising. It was too early for correspondents to make close estimates of acreage and yield of medium red clover seed because practically none of the crop had been hulled and only a small percentage had been harvested.

The quantity of red clover seed in the hands of growers and country shippers is almost negligible, as was shown by the reports. The production of alsike clover seed this year is estimated to have been about 90 per cent that of last year. Much of the 1919 crop had been hulled at the time of the inquiry and fairly good yields per acre were obtained in sections that ordinarily produce considerable seed of this variety of clover. The drouth during the early summer did not affect the alsike clover seed crop nearly to the same extent that it did the medium

red clover seed crop. In most of the producing sections the acreage was below normal, but in some of them it was larger than that of last year. Doubtless the high prices that were being offered for this seed at harvest time influenced many to cut their crop for seed. On August 22, prices ranging from \$30 to \$36.75 per 100 pounds were being offered for country-run seed and \$33.20 to \$39 for recleaned seed, which were from \$12 to \$16 per 100 pounds more than the prices that prevailed last year at a corresponding time. Stocks of all seeds in the hands of the growers, shippers, and dealers are undoubtedly the smallest they have ever been.

STOCKS OF SEEDS IN THE UNITED STATES

The following table gives the stocks of certain field seeds in the United States on June 30, 1919 compared with June 30th, 1918.

Name	Stocks on hand June 30th	
	1919	1918
	Pounds	Pounds
Red clover.....	1,838,560	4,177,647
Alsike clover.....	239,587	3,059,422
White clover.....	348,538	845,861
Crimson clover.....	1,399,392	1,345,819
Sweet clover.....	862,075	1,217,976
Bur clover.....	109,244	205,728
Alfalfa.....	4,242,443	11,320,640
Rape.....	1,329,373	4,070,449
Timothy.....	56,822,806	80,744,706
Redtop.....	9,767,112	11,981,823
Orchard grass.....	240,729	1,066,230
Meadow fescue.....	459,726	851,779
Common spring vetch.....	254,572	2,119,976

FARM VALUE OF SEEDS IN THE UNITED STATES

State	Clover seed per bushel				Timothy seed per bushel				Alfalfa seed per bushel			
	As sold		As bought		As sold		As bought		As sold		As bought	
	1919	1918	1919	1918	1919	1918	1919	1918	1919	1918	1919	1918
Maine.....	\$	\$	29.40	19.00	\$	\$	6.60	4.50	\$	\$	\$	\$
New Hampshire..			29.00	18.00			6.60	5.00				
Vermont.....			30.30	20.00			6.30	4.50			16.00	14.40
Massachusetts..			27.10	19.40			6.50	5.50				
Rhode Island...			28.50				5.80					
Connecticut....												
New York.....	24.00		29.10	18.80	6.00	4.00	6.50	5.10			16.00	14.40
New Jersey....			28.30	19.50			6.40	4.80			17.40	
Pennsylvania...	28.00	17.00	29.68	19.50	6.30	4.50	6.60	5.00	14.30	14.26	16.60	14.70
Delaware.....												
Ohio.....	26.00	15.00	28.00	17.10	5.10	3.90	5.80	4.50	17.00	13.80	18.60	14.80
Illinois.....	23.90	14.00	27.70		4.90	3.80	6.50	4.90			16.50	
Michigan.....	26.40	16.60	30.20	19.50	5.60	4.00	6.10	5.00	15.30		18.40	15.50
Wisconsin.....	24.20	15.60	28.60	17.50	4.70	4.00	5.76	4.40	15.00		18.00	14.70
Minnesota.....	22.20	14.60	28.00	15.20	4.00	4.20	4.90	4.80			22.00	
Iowa.....	23.90	16.20	27.50	17.00	4.90	3.70	5.50	4.30	16.50		18.60	14.20
North Dakota..					4.40	3.50	5.20	4.00			19.00	
South Dakota..									13.70	12.00	17.00	13.40
Idaho.....	21.40	14.20	27.30	18.00			6.70	5.20	14.00	11.20	16.50	13.70
Washington....			27.80	20.70			5.80	5.40			20.00	18.50
Oregon.....	24.00	16.50	27.50	18.00	6.00		6.40				19.00	
California.....									14.40	12.10	15.60	13.30

IMPORTS OF SEED INTO THE UNITED STATES

Red Clover Seed (Free)

Imported from—	Year ending June 3)					Average prices year ending June 30	
	1914	1915	1916	1917	1918	1914	1918
	lb.	lb.	lb.	lb.	lb.	cents per lb.	cents per lb.
Austria-Hungary.	112,708		33,275				
Denmark.....			22,214,818	4,817,383	187,000	12.4	19.0
France.....	5,255,930	8,170,792	44,000			13.5	
Germany.....	556,207	8,800	10,256,053	660	647,479	14.9	17.3
Italy.....	44,000	262,144	55,086				
Netherlands...	33,075			176,192			
Russia in Europe			22,046				
Spain.....			783,781	45,668		10.2	
United Kingdom	632,892	18,701	67,342	561,005	48,790	13.7	20.0
Canada.....	129,406	79,825		135,779	22,440		22.1
Chile.....		209,495		43,898			
Peru.....				32			
Japan.....				190,650			
Russia in Asia							
Totals and averages.	6,764,218	8,749,757	33,476,401	5,971,267	905,709	12.3	17.9

All Other Clover Seed (Free)

Imported from—	Year ending June 30.					Average prices year ending June 30.	
	1914	1915	1916	1917	1918	1914	1918
	lb.	lb.	lb.	lb.	lb.	per lb.	per lb.
Austria-Hungary..	582,348	666,971				11.3	
Belgium.....		176,000					
Denmark.....	172,936	369,745				10.6	
France.....	10,146,780	10,708,534	4,750,049	5,230,562	1,130,004	6.3	
Germany.....	3,643,934	327,775				8.6	
Italy.....		81,402	44,100		637,585		30.5
Netherlands...	15,105	30,096	110,952	13,200	30,240	11.8	11.1
Norway.....			34,179				
Russia in Europe	110,058	30,665		43,560		14.5	
United Kingdom...	2,981,090	1,410,184	589,146	1,117,672	547,470	6.4	12.4
Canada.....	5,612,110	1,445,255	1,553,267	5,093,361	4,649,091	14.3	18.5
Mexico.....					1,014		
Dominican Republic.			290				
Dutch East Indies.			500				
Japan.....	17,960	151,126	9,146	5,800	5,900	5.2	29.3
Russia in Asia...			1,215,637	601,571			
Australia.....		4,721	4,671	42,886	71,082		21.0
New Zealand...	61,110	4,480	51,423	52,280		6.0	
Totals..	23,343,431	15,406,054	8,363,360	12,200,892	7,072,386	8.8	18.7

All Other Grass Seed (Free)

Imported from—	Year ending June 30.					Average prices year ending June 30.	
	1914	1915	1916	1917	1918	1914	1918
	lb.	lb.	lb.	lb.	lb.	per lb.	per lb.
Austria-Hungary..	231,120					4.1	
Belgium.....	148,630					2.3	
Denmark.....	339,895	410,332	711,073	1,218,884	57,864	10.6	15.7
France.....	174,505	1,239,795	578,587	90,193	3,874	8.3	31.1
Germany.....	18,311,136	4,608,274	121,385			6.0	
Greece.....		2,351					
Italy.....	11,946	21,380	4,400		37,478	4.3	
Netherlands..	322,667	1,787,545	84,888	9,520		10.5	
Russia in Europe..	1,805,068	127,253	16,013	365,021	176,660	5.3	14.0
Spain.....		44,000	436,689	26,956			
Sweden.....	22,797	115,990	270,208	49,000		5.1	
Turkey in Europe ..	307,604	12,100					
United Kingdom	7,142,874	4,318,122	2,877,876	2,738,482	2,163,945	2.8	8.1
Canada.....	1,201,133	736,030	689,446	1,060,207	1,043,819	5.0	10.2
Guatemala.....				3,084			
Mexico.....	38,223		3,892	3,537	8,140		
Jamaica.....				4,520			
Cuba.....	100						
Argentina.....	77,000	567,570	101,206			10.5	
Brazil.....	215			220			
China.....	26,936	18,785	4,800	101,831			
India.....	975,612	3,290,616	89,600				
Hong Kong.....				35,100			
Japan.....	396,601	17,237,719	1,693,450	1,595,727	451,120	2.3	3.0
Russia in Asia ..	44,000		1,060,664	1,673,919	1,542,345	5.4	3.4
Turkey in Asia ..	32,192						
Australia.....	173,925	34,126	22,655	119,124	141,965	7.5	26.2
New Zealand ..	153,522	118,271	23,688	92,288	344,150	7.7	17.4
South Africa ..			400		3,584		
Totals	31,937,701	34,690,259	8,790,920	9,187,613	5,974,944	5.1	8.4

Sugarbeet Seed (Free)

Imported from—	Year ending June 30.					Average prices year ending June 30.	
	1914	1915	1916	1917	1918	1914	1918
	lb.	lb.	lb.	lb.	lb.	per lb.	per lb.
Austria-Hungary..	633,466	873,465				7.3	
Denmark.....	9,427	80,102	2,311	10,000		11.0	
France.....	24,299	15,501	183,048	22,178	2,308	9.2	48.8
Germany.....	8,848,464	10,171,955	945,104			7.8	
Italy.....		2,060	448				
Netherlands ..	222,126	4,688,045	1,977,673		1,819,350	7.1	20.0
Russia in Europe ..	352,452	150	2,213,460	8,139,800	9,009,233	8.2	33.2
Sweden.....		22,046	9,797				
United Kingdom ..	80,639	22,912	33,135	45,945	49,409	6.6	32.2
Canada.....	35,025	6,425	9,028	6,602	3,818,678	9.9	24.1
China.....				3,800			
Japan.....					932,972		27.0
Russia in Asia ..	88,000		3,668,486	6,241,449	3,593	8.5	12.8
Totals	10,293,898	15,882,661	9,042,490	14,469,774	15,635,542	7.8	29.0

EXPORTS OF SEEDS FROM THE UNITED STATES

Clover Seed

Exported to—	Year ending June 30.					Average prices year ending June 30.	
	1914	1915	1916	1917	1918	1914	1918
	lb.	lb.	lb.	lb.	lb.	per lb.	per lb.
Denmark.....	24,690	955,389	95,263	534,913	1,049,788	16.7	19.8
France.....		5,430				15.2	
Germany.....	203,171	10,551					
Italy.....	18,840	33,150					
Netherlands.....	15,000	10,844					
Sweden.....			5,525	71,358			
United Kingdom.....	493,626	3,121,355	196,426	34,300			
Canada.....	3,326,952	5,598,542	1,984,648	2,168,931	4,822,757	15.0	26.0
Mexico.....		400	4,801,731	1,918,005	2,586,886	14.8	29.0
Argentina.....		690			11,025		
Chile.....	3,625			469,299	444		
Australia.....	34,104		200	46,140	241		
New Zealand.....	514,756	8,091	31,312	15,990	60,900	20.1	20.3
Other Countries....	6,088	5,622	1,115	581,902	896,438	14.8	22.1
				44,290	10,835		
Totals.....	4,640,852	9,750,064	7,116,220	5,886,893	9,439,314	14.9	25.7

Timothy Seed

Exported to—	Year ending June 30.					Average prices year ending June 30.	
	1914	1915	1916	1917	1918	1914	1918
	lb.	lb.	lb.	lb.	lb.	per lb.	per lb.
Belgium.....	75,928					5.0	
Denmark.....	325,392	3,155,180	1,097,165	493,405	137,730	5.9	8.0
France.....	120,137	22,934	36,666	100,323		5.1	
Germany.....	2,156,261	449,488				5.0	
Netherlands.....	137,828	215,506		38,150		4.9	
Norway.....			38,650		175,500		11.1
United Kingdom....	1,103,653	1,799,463	1,261,112	3,020,241	1,616,463	5.3	9.3
Canada.....	8,419,442	11,553,700	10,935,730	11,196,094	6,165,821	5.8	8.4
Newfoundland....	18,024	49,168	4,445	191	6,000		
Australia.....			50,083	454			
New Zealand.....	9,131	87,477	87,896	288,895	406,464	6.0	11.0
Other Countries....	114,498	228	98,510	2,160	12,195		
Totals.....	12,480,294	17,333,144	13,610,257	15,139,913	8,520,173	5.5	8.8

All Other Grass Seeds

Exported to—	Year ending June 30.					Average prices year ending June 30.	
	1914	1915	1916	1917	1918	1914	1918
	lb.	lb.	lb.	lb.	lb.	per lb.	per lb.
Denmark.....	61,585	909,749	358,829	34,869	56,150	10.1	17.1
France.....	84,851	59,361	90,877	42,695	40,616	11.4	14.0
Germany.....	1,869,092	122,640				12.3	
Netherlands.....	705,077	304,561	102,509	65,970		11.3	
Sweden.....			200,956				
United Kingdom....	1,076,496	1,382,302	853,681	1,159,988	1,175,424	14.0	20.6
Canada.....	1,155,220	1,355,794	1,919,804	2,282,433	1,577,192	8.4	11.8
Mexico.....	40,629	61,522	17,292	73,019	94,572		
Cuba.....	3,454	508	905	3,068	18,825		
Argentina.....		34,225	6,506	1,719,968	380,569		19.3
Chile.....	9,820	98	14,433	8,638	7,741		
Japan.....	2,212	1,053	1,050	2,322	2,897		
Australia.....	4,704	2,740	1,800	17,166	1,500	8.4	
New Zealand.....	129,103	100,582	28,100	196,857	195,943	14.3	26.1
Other Countries....	12,558	7,791	16,284	59,054	12,127		
Totals.....	5,156,801	4,342,926	3,613,026	5,666,047	3,563,556	11.6	16.7

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DOMINION OF CANADA
DEPARTMENT OF AGRICULTURE

The Agricultural Gazette of Canada

EDITOR: J. B. SPENCER, B.S.A.

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OF CANADA

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THE AGRICULTURAL GAZETTE of Canada is published monthly, in English and in French, by the Dominion Department of Agriculture. It is not intended for general circulation. A limited number of copies, however, are available to subscribers at \$1.00 per annum, or 10 cents per copy.

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THE CITY MARKET

CIVIC officials are taking a keen interest in city markets, partly with a view to providing commodities of high quality at a reasonable cost to the city dwellers, and also to stimulate greater production and closer competition on the part of the growers. In some of the Canadian cities as much as three quarters of the fresh vegetables and other farm produce purchased by the consumers are bought on the city market. By educating the buying public and the growers, who in many cases could improve the appearance of their produce, this direct business dealing between the producer and the consumer should prove a distinct advantage in urban centres where the cost of living maintains its altitude owing to the exorbitant demands of middlemen who are not exposed to the levelling influence of a city market.

A series of articles on city markets, prepared by responsible officials, appears in Part IV of this issue of *The Agricultural Gazette*. These statements indicate that there does not exist in Canada any uniform system of city market administration. Each city has its own special rules and regulations. In some instances the market is sublet to a sort of publican who buys from the city the privilege to collect tolls or fees from those who bring produce to the market. In other cases, as in Regina, we find a women's organization efficiently conducting the city market on a business basis, while many public markets are directly managed by a committee appointed by the city council. The Hamilton Board of Trade has established a wholesome relationship between its urban and rural peoples by creating a farmers' section of the Board. The friendly co-operation and exchange of views between the two sections result in a better understanding of conditions, consequently the Hamilton market is highly esteemed by growers and buyers. It serves the interests of both. Special features adopted by various market administrations are giving excellent results, for example, the system adopted as at Port Arthur for the selling of consignments of produce by the market manager on a commission basis.

Officials eager to secure ideas which they may employ in the improving of their markets will do well to look into the statements published in Part IV of this number.

RECENT FEDERAL LEGISLATION

TWO bills affecting the agricultural industry were enacted during the recent session of parliament.

Bill 28, an Act to permit the temporary importation, manufacture and sale of oleomargarine in Canada, defines the ingredients of oleomargarine and permits its importation, free of duty, and manufacture in Canada until the 31st day of August, 1920, and the sale thereof until the first day of March, 1921. Persons importing or manufacturing oleomargarine in Canada must first obtain a license from the Minister of Agriculture, who has power to cancel such license for any violation of the provisions of this Act. No person shall sell, offer for sale, or have in his possession for sale any oleomargarine unless the packages containing it are labelled or marked oleomargarine, and it is provided that the Governor in Council may make such regulations as he deems proper respecting:

- (a) The importation, manufacture, inspection and sale of oleomargarine.
- (b) The issuing of licenses for the importation and manufacture of oleomargarine.
- (c) The seizure and confiscation of apparatus and materials used

in the manufacture of oleomargarine in contravention of any of the provisions of this Act or of any regulation made thereunder.

- (d) The efficient enforcement and operation of this Act.

Persons guilty of violations under this Act are liable to a penalty of not less than ten dollars.

Bill 7, an Act to amend the Adulteration Act (respecting bran and shorts or midlings) as passed by the House of Commons November 8 amends section 3 of the Adulteration Act, Revised Statutes of Canada, 1906, Chapter 133, by adding thereto the following paragraph:

- "(j) in the case of bran and shorts or midlings, if it contains anything that is not a product of wheat, or in the case of corn bran, if it contains anything that is not a product of maize or Indian corn"—

the product shall be deemed to be adulterated, and parties convicted in connection therewith shall be liable to a penalty for first offence, (a) for adulteration of produce \$200, or 3 months in jail, and (b) for sale of adulterated produce \$100. For subsequent convictions offenders shall incur heavier penalties.

MILLING AND BAKING VALUE OF SPROUTED WHEAT

BY DR. F. J. BIRCHARD, CHEMIST, DOMINION GRAIN RESEARCH LABORATORY, DEPT. OF TRADE AND COMMERCE, WINNIPEG

THE value of flour milled from sprouted wheat is now being studied in the Grain Research Laboratory, Department of Trade and Commerce, Winnipeg, and, while as yet there has not been sufficient time to complete the large number of tests necessary in any investigation of this character, certain definite results have already been obtained which are of great interest.

The samples tested were, for the most part, graded by the inspector, "No Grade, Number Three Northern Rejected, tough or damp." Great variations were observed in the amount and degree of sprouting of the different samples of this grade, and since, in addition, the character of the original wheats differed widely before sprouting occurred, great care had to be exercised in drawing con-

clusions from the milling and baking results. It was thus at times difficult to decide whether any particular defect in baking quality should be attributed to the results of sprouting or to the inherent quality of the original wheat. In certain cases it was apparent that the original wheat contained a considerable number of starchy kernels, or was otherwise of inferior quality. In others, it was found that the district in which the grain originated was known to produce wheat of comparatively poor quality. From the series of tests which have been completed, it would appear that the following general conclusions are warranted.

As regards the milling value, the sprouting must be regarded as detrimental, since the scouring loss is increased and the yield of flour decreased. This loss was found in general to increase with the amount and degree of sprouting.

As regards the baking quality, the most marked characteristic was the greatly increased loaf volume when the ordinary baking methods were employed. This was observed in every case where the original wheats were hard, even when the sprouting was far advanced. It was noticed, however, that with this decided increase in loaf volume, the texture of the loaves suffered considerably; though, when the baking method was modified so as to produce a smaller loaf, a corresponding improvement in the texture was obtained. The colour of the bread from the sprouted wheat, when milled alone, was generally poor, though, in those cases where the sprouting was not severe, a certain improvement was noticed. It should be particularly noted, however, that when a mixture was made of flour from wheat grading One, Two and Three Northern, and various percentages up to 25 of flour from sprouted wheat, containing a large proportion of hard kernels, both the colour and texture were invariably improved; but this improvement

could not be obtained if the original wheat was of inferior quality.

The absorption was found to be slightly decreased in every case. The general appearance, and shape of the loaves from the blended flour, was excellent in every way, and the improvement obtained by blending the flour from sprouted wheat with normal wheat was very marked as regards these characteristics.

In conclusion, it should be noticed that the best results with flour from sprouted wheat are to be obtained by mixing the flour with that milled from hard wheat. The baking of flour from sprouted wheat (No Grade Rejected, Three Northern) alone, cannot be recommended; but it has been shown that it can be blended with hard wheat flour to considerable advantage, even in comparatively large proportions. Thus it was found that 20% or more of flour from an average sample of sprouted wheat of this grade could be blended with flour from One Northern wheat to produce a loaf equal in baking quality to that produced from One Northern wheat alone. If the original sprouted wheat was of high quality, this percentage could be considerably increased.

As to the baking quality of Rejected Three Northern wheat (on account of sprouts), as a grade it is difficult to say anything very definite on account of the great variations which occur in the quality of the original wheat and also in the degree and amount of sprouting. It was observed, however, that when the original wheat was inferior and contained a large percentage of starchy kernels, the baking quality was poor, but that hard wheat, on the other hand, could carry a much greater percentage of sprouted kernels without suffering the same deterioration in baking quality. In this case it was only when the percentage was very large and the sprouting far advanced that the poor texture, colour, etc., referred to above, became evident.

PART I

Dominion Department of Agriculture

THE EXPERIMENTAL FARMS

SHEEP GRADING EXPERIMENT AT BRANDON EXPERIMENTAL FARM

BY W. C. MCKILLCAN, B.S.A., SUPERINTENDENT

IN the years 1910 and 1911 a flock of western grade sheep was purchased for Brandon Experimental Farm. These sheep were typical of the sheep that come off the western ranges, being small in size and showing much mixing of breeding. They might be called a typical mongrel range flock. Unfortunately no record was taken of the weight per sheep of the original flock, but from experience with similar sheep since, we feel safe in saying that their average weight would be less than 115 pounds. The average clip of wool taken off them the first spring was $7\frac{1}{4}$ pounds.

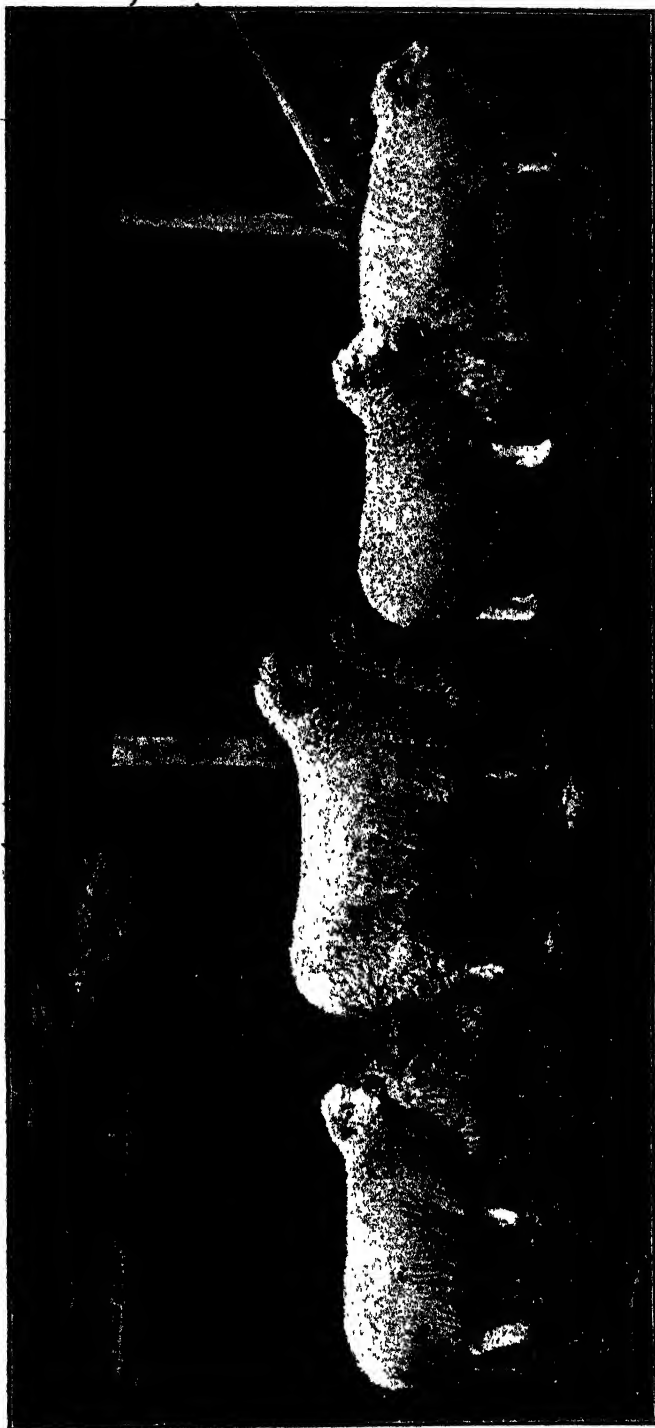
On this flock there has been used consistently Oxford Down rams of good breeding. The Oxford Down was chosen for this purpose because it is the most popular and widely distributed breed in Manitoba, and because it was believed that it would be suitable in increasing the size and improving the type of such sheep as

were used as the foundation. Doubtless similar results could have been obtained with other breeds.

The first cross of Oxford on this range stock showed the most marked change. The size was greatly increased, the form improved, the faces darkened in color, and the fleece lengthened. The second cross brought a sheep scarcely distinguishable from a pure bred Oxford. Third and later crosses show very slight improvement, and this improvement is dependent on the ram being of outstanding merit.

So rapid is improvement made with sheep, that by 1917 a flock had developed that was uniform; the sheep all had the appearance of high-grade Oxford in size, color, and fleece, and many would pass muster for pure hreds.

The average weight of the mature ewes in the flock now is 175 pounds, and the average fleece shorn in the spring of 1919 was $8\frac{3}{4}$ pounds.



1. BRANDON: SHEEP GRADING EXPERIMENT.—MONGREL RANGE EWES WHICH WERE USED FOR FOUNDATION STOCK AND AN OXFORD DOWN
RAM USED FOR GRADING UP.



2. EWES RESULTING FROM THE FIRST CROSS OF OXFORD DOWN BLOOD ON RANGE STOCK.



3. EWE LAMBS RESULTING FROM SECOND CROSS OF OXFORD DOWN BLOOD ON RANGE STOCK.

DAIRY AND COLD STORAGE BRANCH

DOMINION EDUCATIONAL BUTTER SCORING CONTEST, 1919

BY J. A. RUDDICK, DAIRY AND COLD STORAGE COMMISSIONER

THE Dominion Educational Butter Scoring Contest, the plan of which was announced in the March issue of the "Agricultural Gazette," has been carried out along the lines proposed, the last

samples having been received at the scoring station during the first week of October. The following table shows the number of samples received throughout the contest from the different provinces, by months:

Month	B. Columbia	Alberta	Saskatchewan	Manitoba	Ontario	Quebec	N. Brunswick	Nova Scotia	P. E. Island	Total
May	3	4	3	4	1	3	4	1		23
June	3	4	4	2	4	4	3	4	4	32
July	3	4	3	3	4	4	4	2	4	31
August	3	4	4	3	4	4	4	3	4	33
September	3	3	4	4	3	4	4	2	4	31
October	3	3	4	4	3	4	4	2	4	31
Total	18	22	22	20	19	23	23	14	20	181

All the samples were scored at the time they were received, and have been re-scored every succeeding month. It is proposed, if possible, to continue the re-scoring until all the samples have been examined 6 times.

Interim reports on the scoring, giving the churning records of every sample, have been sent to all the creameries engaged in the contest, to dairy officials in the different provinces, and to others who are interested enough to ask for them. A complete and final report will be prepared for general distribution.

Some very valuable information will be made available to butter-makers, creamery managers, and dealers in butter, when this work is completed.

Arrangements are being made to have a number of the samples at the various dairy conventions and other places where butter makers and dealers may foregather during the coming winter, in order that as many

as possible of those who are interested in such matters shall have an opportunity of examining the samples and judging for themselves of the results the contest.

Dairy officials from all the provinces have been present at different times while the scoring of the samples was being carried out. Some of the leading dairy officials in the United States have also requested the privilege of being present, and, needless to say, they were made welcome.

The official scorers were P. W. McLagan, Managing Director for Lovell and Christmas, Montreal, Que., J. B. Muir, of the Ingersoll Packing Co., Ingersoll, Ont., and Geo. H. Barr, Chief Dairy Division, Ottawa.

The officers of the Branch who are responsible for this contest feel that a beginning only has been made, and it is hoped to continue the work another season on a more extended plan.

FRUIT BRANCH

CANADIAN RAILROADS AND AGRICULTURAL DEVELOPMENT

G. E. MCINTOSH, IN CHARGE OF TRANSPORTATION

THE problem before the fruit and vegetable growers of Canada today is, first, to develop a product of quality, then to create a larger demand on the part of the consumer and finally to perfect as nearly as possible a system of efficient economical distribution. In the first and second instances educational work may be promoted from every source, but the meat of the nut is distribution. This can be satisfactorily accomplished only by putting into effect a close co-operative scheme between the agricultural interests and the railway and express companies.

It is generally conceded that in Canada, where perishable farm and orchard products must move during severe weather conditions, special attention should be given to the question of efficient transportation. Almost every branch of agriculture, but particularly fruit, vegetable, poultry, dairy and live stock interests, are inseparably bound together with transportation interests. It is interesting to note that agriculture, including the products of animals, is contributing approximately 24 per cent of the total railway freight tonnage. This year, for instance, in apples alone, Canadian railways will handle possibly 15,000 carloads.

In the United States some interesting statistics are available as to what has been accomplished by the railways extending assistance to agricultural districts along their lines. Previous to the war, one company had for eight years been engaged in organizing farmers' associations in the district through which it ran, until there was hardly a town of 300 people on its lines which had not an active association of farmers for the promotion of diversified crops. The result was that in 1915 the road hauled in

90 days 3,500 cars of truck and fruit as against practically none five or six years ago. Another company states that through similar efforts, fruit and truck growing increased fully 100 per cent in five years. Another company says: "The result of the work has been an increase from almost nothing, in the way of fruits and vegetables, to many hundreds of cars annually."

One company publishes for distribution among its patrons a monthly magazine; another opened up a locality specially adaptable to the growing of strawberries, eight acres being put out the first year. This has developed until last year that road hauled something over 600 carloads. Eight companies have established experimental and demonstration farms.

Canadian railways are just as deeply concerned in the welfare of this great industry in Canada. They have carried out experimental tests, provided a great many agricultural displays, built warehouses for storage of perishable products and, where reasonable demands have been made upon them, service has been greatly improved. While, however, much has been accomplished, a great deal more can be done co-operatively towards greater development.

The policy of the Fruit Branch in its transportation work is to create a closer relationship among producers, shippers, consignees and the carriers, to receive complaints of shippers, to investigate and negotiate with the carriers, and in brief, to perfect as nearly as possible the distributing system as it applies to the fruit and vegetable industry.

It is evident, in order that a railway company may profit to the fullest extent from the fruit and vegetable growers contiguous to its lines, that it

must do more than construct tracks, run trains and carry freight; it must come in a helpful way into direct personal contact with the growers' interests. This can best be done through a central representative of these growers and with this object in view a special study of local transportation matters is made in any province, any district or at any shipping point, upon request from shippers.

The country is today more interested in ample, safe and rapid transportation than in cheap transportation. This applies to the fruit and vegetable industries even more forcibly than to manufacturing or other lines of industry. The day is not far distant when train schedules will be re-arranged whereby trains may accommodate moving crops rather than expedite passenger travel. Even now low assembling rates are being provided, mixing privileges extended, joint commodity rates established, suitable minimums obtained, preferred attention given in the supplying of cars, and in many other ways help is being given to secure for the producer the best possible marketing facilities.

On the other hand the growers and the shippers in many producing sections of Canada are still marketing under adverse transportation conditions. Where the situation is such, we hope to assist in bringing about improvements, and therefore want to

know what complaints the producer of perishable foodstuffs may have relating thereto. The fact that fifty million dollars worth of fruit and vegetables are being annually produced in the Dominion of Canada, requiring say 500,000 cars, or an equivalent, to transport the same to market, and that ten years hence the annual value of the fruit produced will possibly double the above figure, makes the transportation and distribution of this enormous crop of perishable foodstuffs one of the greatest problems confronting the growers of Canada today. It is estimated that the entire car equipment of all railways in Canada, at an average haul of 216 miles per car, would be in use four times during the average season to market the fruit crop.

This merely touches on a few of the most important aspects of the situation but it conveys to one's mind the important relationship of transportation to agriculture, and to the fruit and vegetable industries in particular. There is this to bear in mind, that proportionately to population, Canada is even better equipped in railway mileage than our neighbours to the south, who are five times better equipped than the European countries. This being the case, agriculture in all its branches and the railways of Canada are interdependent.

SEED BRANCH

FINAL SEED SURVEY REPORT, 1919

BY E. D. EDDY, B.S.A., CHIEF SEED INSPECTOR

THE regular channels of the seed trade in Canada and the United States were greatly interfered with during the war. For many kinds of seeds, particularly root and vegetable, the American continent had been depending largely on European supplies. Owing to the interruption of seed growing in Europe and the difficulties of transportation it was impossible for Cana-

dian and United States seedsmen to secure delivery from overseas of their requirements in many kinds of seed and the growing of seed on the American continent was undertaken on a larger scale than ever before. The situation was further complicated by poor crops of some kinds of seed in America and it was considered advisable to institute greater govern-

ment supervision of seed distribution, especially exports.

A special Seed Reporting Service was established under the Bureau of Markets by the United States Government to procure and distribute information respecting seed supplies and the Seed Stocks Committee was formed to advise the War Trade Board respecting the issuing of export and import licenses for seed shipments. In Canada the Seed Branch acted in much the same capacity as the Seed Reporting Service and the Seed Stocks Committee did in the United States by procuring information respecting seed supplies and making recommendations to the Canada Food Board regarding applications for export licenses. Throughout this work the Seed Branch acted in close co-operation with the United States Department of Agriculture.

One of the most important features in connection with securing information regarding available seed supplies have been the semi-annual seed surveys conducted concurrently in Canada and the United States. Seedsmen and seed growers were required to make returns showing stocks on hand, total receipts and exports at or during stated periods. With this information it was possible to know whether seed requirements for the season were in sight and to give reliable advice respecting applications for trade permits.

The first survey was conducted on February 1, 1918. This was followed by others on July 1, 1918, January 1, 1919 and June 30, 1919. The summary results of the surveys were published in the Seed Reporter, the official organ of the Seed Reporting Service of the United States Depart-

ment of Agriculture. Through the courtesy of the United States Department, the Seed Reporter has been distributed to Canadian seedsmen who were asked to make returns for the seed survey.

The preliminary report of the seed survey made in Canada on June 30th last was published in the October number of the Seed Reporter. The complete figures have since been compiled and the final report is presented herewith. From the table it will be noted that with some kinds of seeds the carry-over from last season, as indicated by stock on hand June 30th, is very light in comparison with the previous year. This is particularly true of clovers and timothy seed. Last spring when export permits were granted for seed shipments to Europe, a serious shortage of clover seed developed in Canada and the United States which caused a greater demand for timothy with the result that the stocks of all these lines are very low. The situation is made more serious through the fact that the present seed crop, red clover particularly, is very light. With most kinds of root and vegetable seeds the carry-over is fairly liberal and stocks are in sight for the season's requirements.

Exports: The principal items reported as exported during the year ending June 30, 1919, are as follows (pounds in all cases): Red Clover, 850,165; Alsike, 10,019,462; White Clover, 8,000; Sweet Clover, 1,016,126; Timothy, 404,266; Canada Blue Grass, 615,994; Common Spring Vetch, 492,000; Hairy Vetch, 22,544; Dwarf Snap Beans, 61,641; Garden Pole Beans, 96,000; Garden or Canning Peas, 8,640,594.

SEED SURVEY, JUNE 30, 1919.

Item.	Stock on Hand June 30.		Total Receipts Year Ending June 30.	
	1919.	1918.	1919.	1918.
	Pounds.	Pounds.	Pounds.	Pounds.
Red Clover.....	34,580	560,628	3,870,360	5,487,417
Alsike.....	39,655	1,034,456	15,619,396	10,226,737
White Clover.....	12,518	32,165	65,120	60,750
Crimson Clover.....	3,967	7,586	1,545	5,538
Sweet Clover.....	10,784	261,668	1,744,327	802,169
Alfalfa.....	64,883	167,868	607,430	676,732
Timothy.....	842,965	3,465,285	9,746,064	12,867,809
Red Top.....	104,415	88,320	138,726	136,777
Orchard Grass.....	4,758	27,521	18,565	15,328
Ken. Blue Grass.....	33,198	66,648	60,391	58,292
Can. Blue Grass.....	247,262	349,438	1,427,528	1,805,659
Bromus Inermis.....	7,441	4,625	566,433	156,533
Western Rye Grass.....	45,907	56,088	369,609	263,396
Meadow Fescue.....	3,018	6,549	14,031	15,071
Common Vetch.....	39,923	333,793	958,705	701,333
Hairy Vetch.....	5,029	39,609	62,924	63,669
Common M illet.....	202,707	172,372	464,184	276,059
Foxtail Millet.....	301,684	200,332	670,860	255,889
Barnyard Millet.....	9,647	34,341	17,818	40,611
Rape.....	120,443	147,532	245,442	229,140
Seed Corn.....	1,045,322	1,356,537	10,564,268	15,196,109
Beans, D. Snap.....	366,464	233,421	655,411	471,053
“ Garden Pole.....	36,003	16,033	139,857	98,358
*Beet, Garden OS.....	20,429	36,103	19,607	38,434
* “ “ Am.....	42,786	20,632	60,270	24,544
“ Mangel OS.....	256,612	260,934	151,933	177,775
“ “ Am.....	13,676	2,863	28,599	9,123
“ Sugar OS.....	265,596	506,186	307,600	23,492
“ “ Am.....	90,346	44,187	71,089	49,971
Cabbage OS.....	9,493	9,404	6,60	3,926
“ Am.....	10,383	5,093	8,706	8,306
Carrot.....	55,292	38,533	60,477	51,150
Cauliflower.....	1,439	665	1,873	790
Celery OS.....	1,418	1,646	536	461
“ Am.....	2,065	1,318	1,367	1,319
Cucumber.....	37,531	31,003	32,599	30,082
Kale.....	1,164	1,262	488	973
Lettuce.....	24,121	18,875	20,064	20,017
Muskmelon.....	3,809	3,853	2,308	2,467
Watermelon.....	6,253	6,253	4,331	4,584
Onion Seed OS.....	11,201	1,296	14,381	4,884
“ “ Am.....	54,906	26,810	81,219	48,741
Onion Sets.....			1,808,148	2,073,903
Parsley.....	3,028	3,242	3,642	2,982
Parsnip.....	7,220	1,936	13,367	9,556
Peas, Garden.....	3,520,758	892,747	18,939,148	13,548,263
Pepper.....	728	545	552	503
Pumpkin.....	7,446	9,132	7,578	9,590
Raddish OS.....	20,960	15,501	14,324	7,770
“ Am.....	37,413	22,489	49,194	29,531
Salsify.....	819	747	777	1,086
Spinach OS.....	14,814	14,621	13,697	11,359
“ Am.....	12,929	992	15,587	2,185
Squash Summer.....	3,753	4,318	4,481	3,016
“ Winter.....	3,294	2,464	2,932	3,484
Sweet Corn.....	212,669	55,339	486,011	210,473
Tomato.....	6,924	4,659	5,495	4,452
Turnip, English.....	127,077	95,929	64,432	67,723
“ Swede OS.....	335,522	197,730	278,988	244,446
“ “ Am.....	6,822	1,339	21,799	9,412

*O.S. produced overseas. Am. produced in American continent

PART II

Provincial Departments of Agriculture

STUDENT ENROLMENT

The agricultural colleges, veterinary colleges, and schools of agriculture throughout the Dominion have this year an attendance larger than ever before. The following statements from a number of the agricultural and veterinary colleges give in detail the enrolment of students for the various years.

NOVA SCOTIA AGRICULTURAL COLLEGE

BY M. CUMMING, B.A., B.S.A., D.A.S.C.

THE enrolment on the opening date of the college was in the junior classes, sixty-one, and in the senior classes, twenty-nine.

In addition to the regular classes we have a class of thirty-five soldier students in attendance here.

SCHOOL OF AGRICULTURE, STE. ANNE DE LA POCATIERE, QUEBEC

BY NOEL PELLETIER, DIRECTOR

WE have thirty-one students enrolled in the School of Agriculture. These are

divided into classes as follows: Fourth year 1, third year 9, second year 6, and first year 15.

MACDONALD COLLEGE

BY F. C. HARRISON, P.H.D.

THE following is a complete summary of students registered, to date, for the session 1919-1920.

SCHOOL FOR TEACHERS:

Model class.....	2	110	112
Kindergarten class..	0	3	3
Elementary.....	0	31	31
	2	144	146

SCHOOL OF AGRICULTURE:

	Men	Women	Total
1st year.....	43	2	45
2nd year.....	26	0	26
3rd year.....	27	2	29
4th year.....	16	1	17
Special students....	4	0	4
Dept. of Soldiers' Civil Re-establishment students....	36	0	36
	152	5	157

SCHOOL OF HOUSEHOLD SCIENCE:

Institution Adminis- tration Senior.....	0	10	10
Institution Adminis- tration Junior.....	0	47	47
Homemakers.....	0	47	47
Autumn Short Course	0	17	17
Student workers (Sept. to Xmas) and Winter Short Course.....	0	2	2
	0	80	80
	154	229	383

OKA AGRICULTURAL INSTITUTE, LA TRAPPE, P.Q.

BY BRO. M. YVES, SECRETARY

THE number of students registered at this institution is as follows:

1st year.....	42
2nd year.....	20

3rd year.....	9
4th year.....	21
Short course (1 year)...	20

making a total of 112 students enrolled.

ONTARIO AGRICULTURAL COLLEGE, GUELPH

BY S. H. GANDIER, B.S.A., SECRETARY

THE total attendance of students taking the various regular courses at this institution was, according to the college register, on Oct. 23, 1919, as follows:—

REGULAR AGRICULTURAL COURSE

First Year..	267
Second Year.....	132
Third Year..	93
Fourth Year ..	57
Total ..	549

COURSE FOR DEGREE OF B.S.C. (AGR.)

Third Year..	1
Fourth Year..	2
Total ..	3

NORMAL COURSE IN MANUAL TRAINING...	6
SPECIAL STUDENTS IN AGRICULTURE.....	3

COURSES IN DOMESTIC SCIENCE AT MACDONALD INSTITUTE—

Junior Normal Course....	16
Senior Normal Course..	14
Junior Associate	21
Senior Associate.....	18
Junior Housekeeper..	9
Senior Housekeeper	
Course	17
Homemaker Course.....	22
Short Course (3 months)..	16
Optional students.....	4
Total	138
Total attendance..	697

MANITOBA AGRICULTURAL COLLEGE, WINNIPEG

BY G. A. SPROULE, REGISTRAR

BELOW is given a complete list of students registered at the Manitoba Agriculture College.

Regular students in agriculture taking full 5 month course.

First year.....	150
Second year.....	51
Third year.....	34
Fourth year..	15
Fifth year.....	16

Total of students in Agriculture... 226

Regular students in home economics taking full 5 month course.

First year	85
Second year	22
Third year	7
Fourth year.....	7
Fifth year.....	5

Total of students in Home economics..... 126

Students taking 4 month course in engineering and general agriculture... 112

Total..... 464

On the 15th of November 50 Soldiers entered from the Soldier Settlement Board to take a three month course.

COLLEGE OF AGRICULTURE, UNIVERSITY OF SASKATCHEWAN

BY W. J. RUTHERFORD, B.S.A., DEAN

THE students at the college of agriculture of the University of Saskatchewan are pursuing two courses, the associate course and the degree course. The enrolments in these two divisions are as follows:—

Associate course,—1st year 117,

	2nd year	27,
	3rd year	14.
B.S.A. degree,	—1st year	24,
	2nd year	15,
	3rd year	8,
	4th year	7

making a total attendance of 212 for the present academic year.

COLLEGE OF AGRICULTURE, UNIVERSITY OF ALBERTA

BY E. A. HOWES, B.S.A., DEAN

THE enrolment at the College of Agriculture of the University of Alberta is, first year 14; second year 14, and third year 6. these, however, are graduate students and in terms covering degree course the years represented are 3rd, 4th

and 5th. In addition to the regular student body there is in attendance at present a class of 92 returned men taking the five months' special course under the Civil Re-establishment Commission. The total enrolment, therefore, is 125 students.

ALBERTA AGRICULTURAL SCHOOLS

BY A. E. MEYER, LL.B., SUPERINTENDENT

THE Olds and Claresholm agricultural schools opened on the 29th of October with a joint attendance of 169 young men

and 70 young women. The Vermilion school has been reserved for returned soldiers.

COLLEGE OF AGRICULTURE, UNIVERSITY OF BRITISH COLUMBIA

BY F. M. CLEMENT, B.S.A., DEAN

THE enrolment in the course leading to the Degree in Agriculture is as follows:

First year.....	27
Second year.....	15
Third year.....	7

In the vocational classes for returned men the enrolment is 80 with an equal number of a waiting list for January 1st class.

As this is but the beginning of the third year since the organization of the College, there are no fourth year students.

SCHOOL OF COMPARATIVE MEDICINE AND VETERINARY SCIENCE, MONTREAL

BY F. T. DAUBIGNY, M.V., DIRECTOR

THE enrolment of students at this institution for the academic year 1919-20 is as follows:

1st year... .. 7

2nd year.....	6
3rd year.....	7

making a total number of 20 students enrolled according to our register.

ONTARIO VETERINARY COLLEGE

SEVENTY-EIGHT students are taking the courses at the Ontario Veterinary College, made up as follows:

First year.....33 Students.
 Second year....20 Students.
 Third year.....25 Students.

The first year class this year is reduced by the raising of the require-

ments of entrance. Applicants are required to furnish a certificate for at least two years High School education, or failing the possession of this to pass an equivalent qualifying examination prescribed and conducted by the University of Toronto. A number of students were this year unable to comply with these requirements.

PRINCE EDWARD ISLAND

THE COMMISSIONER OF AGRICULTURE

THE Hon. Walter M. Lea, Commissioner of Agriculture for the province of Prince Edward Island in the new Bell government, is an extensive farmer, occupying the farm on which he was born forty-five years ago at Tyrone, in Queen's County. Until a creamery was built in his neighborhood, Mr. Lea gave little attention to stock raising, marketing each year both hay and grain. To improve his herd of ordinary cows, Mr. Lea imported from Ontario a pure bred Holstein sire, and soon afterwards laid the foundation of a pure bred herd, which now ranks with the highest producing and show herds in the Maritime Provinces. A number of his cows hold high official records, his returns for milk this year delivered at the creamery from twelve cows and heifers amounting to more than \$2,200. The Honourable Mr. Lea is also a breeder of sheep, hogs, and horses, and grows potatoes as a marketing crop. Mr. Lea has

been a member of the legislature since 1915.



THE HON. WALTER M. LEA

Canada produces more than sufficient for the wants of Canadians. One thing is often lacking, however, and that is attractive marketing of the product. In many cases, imported fruits and vegetables are being sold, to the detriment of local products, due entirely to the lack of appreciation of the selling value of appearance.

AGRICULTURAL LEGISLATION

BY W. BOULTER, RURAL SCIENCE BRANCH

THERE was no Agricultural Legislation passed in 1919.

The appropriations on account of current expenditure for 1919 chargeable to the local funds were \$20,170 in comparison with \$10,920 for 1918. The increase in the appro-

priation for this year was on account of exhibitions and live stock judging. No grant was paid by the government for exhibitions last year.

The following are the appropriations:

AGRICULTURAL DEPARTMENT

Commissioner, part salary	\$ 900 00
Commissioner, travelling expenses	350 00
Professor of Agriculture, salary	1,400 00
Professor of Agriculture, travelling expenses	300 00
Departmental expenses and contingencies	1,450 00
Printing, stationery, etc	1,000 00
Exhibitions and live stock judging	9,000 00
Farmers' Institutes and educational work	2,070 00
Encouragement of field crops, horticulture, dairying and poultry raising	3,000 00
Vital statistics	700 00
	<hr/>
	\$20,170 00

NOVA SCOTIA

AGRICULTURAL ACTIVITIES

BY J. G. ARCHIBALD, B.S.A., ASSISTANT CHEMIST, TRURO

THE sixth annual convention of the women's institutes of Nova Scotia was held in the science building at the agricultural college, Truro, on October 22nd and 23rd.

The convention was largely attended and was under the direct supervision of the new superintendent of women's institutes for the province, Miss Helen J. Macdougall. Miss Macdougall has just recently returned to her native province from Manitoba, where she was engaged in similar work.

AGRICULTURAL COLLEGE

The agricultural college at Truro commenced its yearly session on Nov. 4th with an enrolment of over sixty first-year students, thirty second-year students, and fifteen in the special class for returned soldiers. This is more than double the attendance of last year. Because of the late apple harvest in the fruit districts and the root harvest elsewhere,

many students have been unable as yet to report. So it is expected that, as in former years, the present attendance will be supplemented by from ten to twenty more, which will make the largest enrolment in the history of the college.

Along with other colleges in America, great difficulty is being experienced in securing boarding houses for the students. There is no dormitory in connection with the institution, but the present situation seems to warrant some movement being made along this line before another year. The college affords excellent educational advantages along agricultural lines for students from all three of the Maritime Provinces, but hitherto has received its entire financial support from the government of Nova Scotia supplemented by the federal aid made available through the Agricultural Instruction Act. The idea of making the college a maritime institution has frequently been discussed. Most certainly the present

sore need of a dormitory affords for the other two provinces (New Brunswick and Prince Edward Island) an excellent opportunity to contribute to the capital account of the institution. An analysis of the make-up of the student body is sufficient for the purposes of this argument.

From Nova Scotia. . . .	50	per cent
From New Brunswick. 26.3	"	"
From P. E. Island. . . .	16.5	"

RAILWAY MANAGEMENT TAKING INTEREST IN AGRICULTURE

The management of the Dominion Atlantic Railway (a subsidiary of the C.P.R.) with lines running from Halifax to Yarmouth, is taking an active interest in the general educational campaign for improved agriculture in Nova Scotia. Recently they joined forces with the local Department of Agriculture in securing moving picture films for the use of Nova Scotia farmers at public meetings. The railway board and the Department of Agriculture (which is identical with the Agricultural College) will work out a joint program that will add this feature to the educational work already planned throughout the province. The machine which will be used is the Pathe-scope, already in use by several other provincial agricultural departments. The principal item of cost in connection with the scheme will be the services of an expert operator, who will take the pictures right in the province.

The D. A. Ry. is also co-operating in several measures for the advancement of agriculture in those portions of the country near the western terminus of its lines, viz., the western part of Annapolis County and the counties of Digby and Yarmouth.

As a preliminary to this work the joint managements have announced a contest for the best acre plot of potatoes, the one condition of the

contest being that the plot must be sprayed with Bordeaux mixture not less than four times. Thirty-two prizes are offered, but the object is not so much the giving of prizes for best fields, but is rather an endeavour to popularize the spraying of potatoes.

Several similar measures will be announced before next year.

DEMONSTRATION ORCHARDS EXHIBIT APPLES

Mr. P. J. Shaw, Provincial Horticulturist, tells us of an exhibit of apples from the model orchards outside the fruit district, put on at the Poultry and Fruit show held in Halifax recently. Although the model orchard work in the province is by no means a new departure, some of the older orchards having been set out nearly twenty years ago, yet this is the first time that any fruit from these orchards has been placed on exhibition. The exhibit was purely voluntary on the part of the orchard owners. Out of the thirty-five on whose farms these orchards are located, sixteen accepted the invitation to send fruit to Halifax, and the result was a collection of 130 plates of tastefully arranged, fine appearing fruit. With the exception of Kings and Halifax, all the counties in the province were represented. In appearance and quality this fruit compared very favorably with that grown in the fruit district. This is just one more object lesson on the possibilities of fruit growing all through the province. Care in the choice of varieties is a long stride toward success. For instance, the Gravenstein which attains such a high degree of perfection in the Annapolis and Cornwallis valleys, is a failure in the eastern and northern parts of the province, while such varieties as Wealthy, Dudley and Duchess, which are not standard varieties in the fruit district, are excellent elsewhere.

PRELIMINARY REPORT OF EGG LAYING CONTEST

J. P. LANDRY, B.S.A., LECTURER AND MANAGER

THE first Nova Scotia annual Egg Laying Contest inaugurated at the Agricultural College consists of 30 pens of fowls chiefly pullets. This contest began on Saturday November 1st, and will continue until September 30th, 1920. Each entry consists of five birds, hens or pullets, male birds are excluded in this contest. Nearly all the pens with the exception of two are pullets. The houses have been erected at the east end of the Poultry Department on a plot of freshly seeded ground and contains four trap nests in each pen. Also a dry feed hopper, grit shell box, a record file, a hopper for hard grain and a small wooden feed trough. The results of the contest will be published weekly, giving the number of eggs produced by each hen in each pen and also the weight of the eggs produced by each. A systematic record of the quantity of feed will be kept in order that at the close of the contest an accurate estimate of the cost of producing the eggs will be made.

To learn how to increase the yield is the real purpose of this contest. It will also show vigour and vitality in the different flocks represented in the contest. The average production of the hens in Nova Scotia according to the last census is about 80 eggs per hen. This perhaps does not, at the present prices of feed, any more than

maintain the fowl for a year. An increase of 10 to 15 eggs per hen for the 1st selection, 2nd from breeds from the most productive layers and 3rd from proper feeding of formulas worked out through long experiences so as to produce eggs and 4th from proper housing with due regard to cleanliness, fresh air, and pure water would result in an immense economical gain to the farmers and poultrymen of the province of Nova Scotia.

The interest in the entries as received has become very keen and a number of breeders who have entered their pen are staking their reputation upon their pen coming out of the contest at the head of the list. These contest pens are not open to the public, but may be visited from outside of the pens by those who are interested. Weekly reports will appear giving full detail, and information can be obtained from the Manager of the Poultry Department, Agricultural College, relative to one or any of the pens in the contest.

A summary of the entries shows that there are six pens of White Wyandottes, six pens of Rhode Island Reds, five pens of White Leghorns, five pens of Barred Plymouth Rocks, two pens of Anconas, one Rhode Island White, one Buff Wyandotte, one Buff Leghorn, one of Buff Orpington, and one Single Combed Brown Leghorn, and one Rose Combed Brown Leghorn.

NEW BRUNSWICK

AGRICULTURAL LEGISLATION

BY E. P. BRADT, B.S.A., SECRETARY FOR AGRICULTURE

THE agricultural legislation passed during the year was of a more or less routine nature. An Act was passed incorporating the New Brunswick Fruit Growers' Association and giving them power to buy supplies and to sell products of all kinds for their mem-

bers. Other legislation introduced by the Minister of Agriculture was "An Act to Assist the Soldier Settlement Board of Canada to Provide Land for Soldier Settlement Purposes in the Province of New Brunswick." This Act sets out in detail what the province is prepared to do in pro-

viding free land for settlement purposes.

The appropriations made to agriculture did not differ very materially from those of 1918, the chief increases being made for "Encouragement of Livestock and Dairying" and to "Exhibitions." In respect to the

latter, there had been no provincial exhibitions held in the province since 1915, due to war conditions. In 1919 four large exhibitions* were held, which increased the expenditure under this heading.

In detail, the following are the appropriations:—

	Appropriation 1918.	Appropriation 1919.
Agricultural Societies.....	\$19,000 00	\$19,000 00
Brown-tail Moth extermination.....	3,300 00	3,000 00
Butter and Cheese Factories.....	150 00	1,300 00
Bonus to Mud Dredges.....	1,700 00	1,000 00
Contingencies.....	2,500 00	3,200 00
Departmental salaries.....	6,416 66	7,100 00
Departmental travelling expenses.....	2,000 00	2,200 00
Farm Settlement Board.....	700 00	500 00
Encouragement of Horticulture.....	1,200 00	1,700 00
Immigration.....	10,000 00	10,000 00
Miscellaneous and Insurance.....	500 00	700 00
Encouragement of Poultry-raising.....	1,000 00	3,000 00
Encouragement of Stock-raising and Dairying.....	6,400 00	9,000 00
Standing Crop Competition and Seed Fairs.....	5,200 00	5,200 00
Bonus to Wheat Mills.....	5,000 00	5,000 00
Maritime Stock Breeders' Association.....	200 00	200 00
Limerock Crusher and Power.....	500 00	500 00
Exhibitions.....	2,000 00	16,700 00
	\$67,766 66	\$89,300 00

CO-OPERATIVE SHEEP SELLING

MR. J. K. KING, Maritime Sheep Representative of the Live Stock Branch, has been instrumental in organizing the co-operative shipment of several carloads of sheep and lambs from the Maritime Provinces to the Montreal market. Maritime sheep men have always been at a disadvantage in marketing their stock, owing to lack of stock yard and abattoir facilities. Through co-operative shipping this

difficulty is being temporarily overcome. In all eight carloads have been forwarded to date, comprising 759 sheep and lambs. The cars were consigned to and sold by a Montreal commission firm, and the lowest returns secured realized \$2.50 to \$2.75 per head more than would have been obtained at home. The farmers claim that prices now paid in the country have advanced as a result of co-operative shipments.

The Co-operative Live Stock Shipping Association affords a means whereby the farmer feeding stock in less than carlots can get just what his stock brings on the central market, less shipping expenses. So far as marketing is concerned, this organization puts the small feeder on a level with the man who feeds a carload at a time.

QUEBEC

AGRICULTURAL CO-OPERATIVE ASSOCIATIONS

L. THERRIEN, B.S.A., AGRICULTURAL LECTURER

AGRICULTURAL co-operative societies in the province of Quebec may have one or several objects: the improvement or development of the various branches of agriculture, the making of butter or cheese, or both; the purchase and sale of live stock, agricultural implements and chemical fertilizers and other agricultural supplies; the purchase, storing, manufacture and sale of agricultural produce.

An association must have at least twenty-five members. The shares are ten dollars each, payable by annual instalments of two dollars. The responsibility of the members is limited to the amount of their shares. A member has only one vote, no matter how many shares he may hold. The shares are made to the name of the owner: they are transferable but the person to whom they are transferred must be accepted by the Executive of the association.

An agricultural co-operative association may become a member of another association, but in this case only one share can be subscribed.

The authorization of the Department of Agriculture must be secured to organize an association. Under an amendment to the Act (1917-18 session) all associations are now compelled to submit a statement of their transactions to the Minister of Agriculture before the fifteenth of February of each year.

Since 1913, about thirty-eight new associations have formed each year, as compared with a total of thirty-eight associations for the first four years, making a grand total of two hundred and seventy associations.

One hundred and twenty of these associations have submitted for the first time a report of their activities, but some of these reports are incomplete. Sixty-four associations are no

longer in existence; sixty have not reported but are still working. Others have not, as yet, answered our request.

The causes of failure are: apathy and self interest on the part of the members, and poor administration. Again, some associations were formed only to collect a sufficient amount for the purchase of breeding animals or expensive machinery.

But the co-operative movement in our province must not be judged by the number of co-operative associations now in operation, nor by the amount of their transactions. There are other associations purchasing or selling through central co-operative associations. For instance, there are in the province over eight hundred and fifty farmers' clubs and nearly two thousand cheese and butter factories. At least one third of these farmers' clubs purchase every spring a large quantity of seed grain or grass and clover seed; as to the cheese and butter factories, only a very small number of them are incorporated under the Agricultural Associations Act, and the Cheesemakers' Association deals mainly, as yet, in butter and cheese. The majority of the shares subscribed to central associations are owned by farmers, scattered all over the province, and with whom these associations have direct and frequent business transactions. An exception should be made, however, for the Federation of Quebec Co-operative Agricultural Associations, which is a federation of agricultural associations.

CENTRAL ASSOCIATIONS

There are four central associations, covering the whole province. Two are purchasing organizations: "The Co-operative Society of Montreal,"

whose headquarters are 10-12 rue du Port, Montreal, and the "Federation of Quebec Agricultural Co-operative Associations," St-Hyacinthe; two are selling organizations: The Quebec Cheesemakers Agricultural Co-operative Association, 68 William Street, Montreal, and the Quebec Seed Growers' Agricultural Co-operative Association, with headquarters at Ste-Rosalie Junction, Bagot county.

THE CO-OPERATIVE SOCIETY OF MONTREAL

This organization, established in 1913, has over two thousand members, many of which are agricultural associations and farmer clubs, with which it trades. This society purchases mainly fertilizers, chemical fertilizers, insecticides, and fungicides, seed grain, grass and clover seed and other produce, such as twine and barb wire. The total turnover was over \$500,000 last year. Like the Federation, this concern has saved a great deal of money to the agricultural community.

THE FEDERATION OF QUEBEC AGRICULTURAL CO-OPERATIVE ASSOCIATIONS

This federation, which was established in 1917, includes 83 agricultural co-operative associations. It was established by Rev. Father J. B. A. Allaire, agricultural missionary, St-Hyacinthe, who is the leading spirit of the organization. The object of this association is to develop and foster the co-operative spirit among its members. The affiliated associations must supply a monthly report of their business; Rev. Father Allaire reads these reports and gives advice, encouragement, and leadership by letters, through lectures, or visits to the directors, the managing secretaries and the members of these associations.

On December 31st, 1918, the total transactions of the Federation were \$87,007.35, with a net surplus of \$430.38.

THE QUEBEC SEED GROWERS' AGRICULTURAL CO-OPERATIVE ASSOCIATION

The object of this organization, established in 1914, is to spread throughout the province the use of seed grain and grass and clover seed of superior quality. It has warehouses fitted with up-to-date grading machines and separators. It sells to the associations affiliated with it seed grain exempt of weed seeds, of high vitality and of pure variety, the most suitable for the locality.

The majority of the shares were subscribed by individual members who took ten shares each; other shareholders are agricultural co-operative associations, having only one share each but enjoying all the privileges of individual members, minus the right to vote, which they renounce when signing their forms of adhesion. The association has a membership of 625. Its subscribed capital is \$61,230, its paid-up capital \$19,323. The total transactions during last year amounted to \$159,453.40.

With a view to reducing the quantity of seed grain imported in the province, the manager of this association, Mr. Louis Lavallée, endeavours to develop pure grain production centres by purchasing grain produced from seed grain sold by the association.

THE QUEBEC CHEESEMAKERS' AGRICULTURAL CO-OPERATIVE ASSOCIATION

This organization was established in 1910 with the object of improving the quality and furthering the sale of dairy products.

By its system of centralization, grading, and sales, it has succeeded in placing the province of Quebec at the head of all other provinces as regards the average quality of butter, and it has also greatly improved the quality of our cheese. During the last ten years it has branched out in the handling of other products, and the amount of its sales has consider-

ably increased from year to year. All the products handled by this Association are graded and paid to the producer according to their relative value and the prices ruling on the Montreal market.

A large share of the success which the local co-operative associations have obtained in the selling of eggs and poultry is due to the Cheesemakers' Association. In 1914 the Cheesemakers' Association, which was then beginning in this branch of trade, sold 382 crates of eggs and 62,577 pounds of poultry; in 1916, 2,987 crates of eggs and 199,413 pounds of poultry; in 1917, 4,872 crates of eggs and 232,179 pounds of poultry; and in 1918, 5,091 crates of eggs and 312,406 pounds of poultry.

The association is now developing an important trade in milk-fattened calves. The farmers have the unwise

habit of slaughtering at birth or selling at an early age the calves which are not kept for breeding, thus losing the profit which they might realize by fattening these calves with milk during three, four, or five weeks before placing them on the market. A gradual and constant improvement in the quality of the calves supplied by the farmers who were the first to start in this trade in 1916 has been noticed. The results are due to the system of grading adopted by the association.

Last fall the Cheesemakers' Association started to trade in live stock, with the greatest success. Over 125 carloads of sheep, pigs, and butcher cattle were sold.

A summary of the operations of the Quebec Cheesemakers' Agricultural Co-operative Association during 1918 is given in the following table:

* Products	No. 1	No. 2	No. 3	Pasteurized	Total
Cheese.....	141,479 boxes	21,671 boxes	1,559 boxes	.....	164,727 boxes
Butter.....	50,580 "	15,143 "	550 "	15,227 boxes	81,500 "
Poultry, alive and dressed.....	119,047 lbs.	115,336 lbs.	78,026 lbs.	.....	312,406 lbs.
Eggs.....	3,343 crates	Strictly fresh	1,697 crates No. 1	.....	5,091 crates
Maple sugar.....	33,712 lbs.	40,455 lbs.	12,697 lbs.	.....	125,036 lbs.
Maple syrup.....	662 gall.	1,739 gall.	1,172 gall.	.....	3,573 gall.
Honey.....	92,331 lbs.	23,445 lbs.	2,243 lbs.	.....	118,019 lbs.
Calves, dressed.....	317	922	1,288	No. 4: 774	3,301
Lambs, dressed.....	1,301	730	.....	.....	2,633
Wool.....	17,134 lbs.	5,186 lbs.	.....	.....	24,438 lbs.
Beans in 120 lb. bags	480 bags	680 bags	310 bags	.....	1,470 bags
Hogs, dressed.....	.....	.....	.....	.....	3,766
Skins.....	.....	.....	.....	.....	3,250
All kinds of live stock sold at Montreal slaughter-houses.....	.....	.....	.....	.....	6,876

Two district slaughter-houses are under the management of the Cheesemakers' Association: the co-operative slaughter-house at Princeville, Arthabaska county, and the co-operative slaughter-house at St-Valier, Bellechasse county.

The total business done last year by the co-operative slaughter-house at Princeville was \$169,718.32. The farmers brought pigs valued at \$128,779.65. This slaughter-house has greatly helped the development

of the bacon hog industry in this locality.

With the help of the Quebec Department of Agriculture, the Cheesemakers' Association has established at Princeville one of the most important poultry stations of the province. The amount of capital invested in the grounds, buildings, incubators, poultry, etc., is over \$10,000. The farmers can have their eggs incubated at this station and secure pure-bred and well-selected

* This table does not include deer, rabbits, canned meats, potatoes, etc., the selling price of which is not given in the above list.

fowls for reasonable prices. It is proposed to make of this district of Princeville a centre for the breeding of pure-bred fowls, where the breeders of the other parts of the province may procure good fowls for the improvement of their flocks. The total sales made last year by the co-operative slaughter-house of St-Valier amounted to \$59,798.50.

The Cheesemakers' Association publishes a weekly newspaper entitled "Le Bulletin des agriculteurs," which has over 6,000 regular subscribers. In addition to valuable information on the condition of the market, this bulletin gives the prices obtained by the Association for the produce sold for its members during the previous week. There are also short notes of the probable ups and downs of the market for the guidance of the farmer. The bulletin is therefore a guide which prevents the producer from selling his products at low prices, benefiting only the country store keeper.

The business of the Cheesemakers' Association is very prosperous. Last year a dividend of 8 p.c. was paid on paid-up capital. Its members number 5,066; the subscribed capital amounts to \$53,340, the paid-up capital to \$26,894.70, and the assets are \$32,053.53. The total turn-over of the association since it was organized to the 31st of December, 1918, is \$21,686,039.45.

DISTRICT ASSOCIATIONS

There are five bee-keepers' associations in the province, three of which are incorporated under the Co-operative Associations Act. They have not, as yet, started to purchase bee-keepers' supplies or sell honey in co-operation. The annual payments received on the shares help to defray the expenses of management and increase the prizes offered by the Quebec Department of Agriculture at the annual honey exhibitions. They are county associations: Lotbinière, L'Islet and Quebec.

Since 1917, nine co-operative associations for the sale of wool and

sheep have been established. The most active are those of Sherbrooke, Richmond, Beauharnois, Châteauguay and Huntingdon counties.

The farmers bring to the place designated by the management the fleeces, which are tied separately and unwashed. These fleeces are weighed and graded by government experts, then the wool is sold by auction or through the Dominion Wool Producers' Co-operative Association. This method of marketing wool is much more profitable for the manufacturer and the farmer alike. There are, in the same fleece, various sorts of wool each of which enters in the manufacture of tissue more or less fine and more or less strong. Grading is therefore indispensable to meet the manufacturers' requirement. If this wool was washed, grading would be practically impossible.

Moreover, unwashed wool brings more to the farmer; it sells at a higher price and its preparation does not require so much work as washed wool. The large difference in prices between the various classes of wool encourages the farmers to give better care to their sheep. They dip them now once or twice a year, during the summer, to kill the ticks and lice, which do so much damage to our flocks.

Last fall six of these associations sold sheep graded according to age and weight for \$36,544.87. The ram lambs and rams of all weights were also graded separately. Here, again, grading gave very good results, as it encourages the breeders to castrate their lambs when they are very young, so as to better fatten them and get a higher price for them.

Two other district co-operative associations also do a considerable amount of business: the Yamaska Agricultural Co-operative Association, with headquarters at St. Césaire, Rouville county, and the Kamouraska Agricultural Co-operative Association, with headquarters at Ste-Anne de la Pocatière. The first deals mainly with the preparation and sale of tobacco; its total turn-over was

\$136,160.67; the second has been bought and sold for over \$110,000 of agricultural products.

LOCAL ASSOCIATIONS

These associations deal with production or consumption, or both. Their object is to sell their products at profitable prices or to purchase at lower prices what may be required by their shareholders for the working of their farms. They avoid the middlemen, as much as possible, by purchasing from central co-operative associations or from wholesale merchants, and by selling through the Cheesemakers' Association or its two slaughter-houses.

Out of 120 reports received, 92 state that they purchase or sell, or both; 16 deal with butter-making or cheese-making, or both; the others handle an agricultural speciality.

The small amount of capital on which these co-operative associations

work, is due to the particular system which they have adopted. The members give their orders beforehand and pay when the goods are delivered. Most of these associations have a credit in the bank or in the local bank, varying from \$2,000 to \$4,000 and this credit is maintained by the signatures of the directors or of the members, who are jointly responsible. An increase in capital is provided for by raising a certain amount on each purchase for the reserve fund.

The associations selling eggs, poultry, butcher cattle, etc., may run without any capital, as most of these sales are effected through the Cheesemakers' Association, which forwards the returns promptly.

Figures concerning the co-operative associations of the province: Members, 14,014; Capital subscribed, \$287,499; Paid-up capital, \$129,501.72; Assets, \$754,063.70; Liabilities, \$554,505.30; Total sales, \$7,155,136.84.

ONTARIO

THE NEW MINISTER OF AGRICULTURE

Mr. Manning William Doherty, B.S.A., M.A. Sc., has been appointed Minister of Agriculture in Ontario. Mr. Doherty is a native of Peel County, Ontario, having been born near Malton on "Clontarf" farm, which he now owns and which has been in the Doherty family since his grandfather purchased it from the Crown more than one hundred years ago.

After passing through the public school, collegiate institute and Upper Canada College, Mr. Doherty obtained the B.S.A. degree after a full course of study at the Ontario Agricultural College. He pursued post-graduate work at the Cornell University where he obtained the M. A. Sc. degree. From 1891 to 1902 he was associate professor of natural science at the Ontario Agricultural College. Leaving that position he entered a business career and in 1912, returned to his homestead



MANNING W. DOHERTY, B.S.A., M.A. Sc.,

which he still conducts, raising Holstein cattle and Clydesdale horses. Since coming to his farm, Mr. Doherty has taken a keen interest in the affairs of the United Farmers of Ontario and in local agricultural movements. He has been president

of the Peel County Milk and Cream Producers' Association, director of the Toronto Milk and Cream Producers' Association, secretary of the Ontario Milk and Cream Producers' Association and director of the United Farmers Co-operative Company.

HOME DEMONSTRATION WORK IN PEEL COUNTY

BY MISS K. F. MCINTOSH, HOME DEMONSTRATOR

HOME Demonstration Work was started in Peel County in April, 1918, for the first time in Canada, through the interest of the late J. W. Stark, as a six months' experiment. The appointment of a home demonstrator was made under the provincial Department of Agriculture. The aim was to give the same service to women and children as the agricultural representative was giving to men and boys and to be carried on co-operatively with him.

The project was divided into four parts—Women's Organizations, rural Schools, Rural Homes and Office Work. Although, during the past year and a half the work has developed, it is still kept under these main divisions.

(1) WOMEN'S ORGANIZATIONS

This resolves itself into work with women's and junior institutes. Red Cross circles have now practically ceased to exist. (As a war measure a food conservation campaign was inaugurated through window displays, newspaper articles and demonstrations on substitutes and canning given at twenty-two points in the county). Meetings were addressed under the auspices of institutes, ladies' aids, Red Cross circles, farmer's clubs and young people's societies—seventy-six in the first six months.

Very many times it was after midnight when one was able to leave the home, hall, school or church but questions from the people evidenced just the interest we wanted to be

sure existed. Suggestions for new activities are often asked for and help given in preparing papers and debates. Circulating libraries have been loaned from the Department of Education and placed in a number of communities under Institute supervision.

A knitting machine was obtained, demonstrations given, and a branch had the use of it for two weeks. In the earlier part of our campaign close watch was kept on Red Cross, Field Comforts, Soldier's Box requirements and Food Regulations, and information given out.

The office of district secretary of the women's institute keeps one in constant touch with all phases of their efforts.

Work with five junior institutes has been intensely interesting. Together with the junior farmer's improvement association meetings have been conducted with business-like procedure to consider household and agricultural problems. Debates, addresses by outside speakers and members themselves and social activities have been promoted. We encourage the giving of plays. Young people enjoy getting together for practice as well as for study and acting. Some of them have developed quite a pronounced dramatic talent. If we can bring our juniors to see that the work they do on the farm is of national value we do well. If we can direct them in bringing in enough actual material return for their toil we do better. If we can help them to find the joy of living in "the daily round and common task"

and show than that a satisfying social life can be enjoyed on the farm we go far toward solving the problem of rural depopulation. Wherever possible we present the idea of short or long courses at Macdonald Institute and the O.A.C. With such in mind, last June, we organized a motor trip to Guelph. Almost two hundred junior farmers and junior institute members took advantage of it.

Both in 1918 and 1919, canning teams of four girls each from our five junior institutes have been trained to compete at the county fair.

Three short courses in home nursing and first aid and three courses in sewing have been given. A number of others will be held this winter. All such work has been carried on with existing organizations. While an endeavour has been made to form new branch institutes, other clubs have not been formed. For instance, where an agitation for a home and school club began, we advised a home and school committee of the institute. This prevented the weakening of an older organization by the formation of a weaker new one, yet it accomplished what was required.

(2) RURAL SCHOOLS. To introduce Household Science we plan to visit every school and teach a lesson in it. Time has not yet permitted this, but requests are in from the greater number of our teachers to do so. A series of lessons on sewing, cooking and house building was planned out and given in six country schools surrounding Brampton. Hot lunches are now served, during the winter months, in several of the schools visited and the idea is spreading to others. Mr. Leake, director of household science in schools, has addressed a number of meetings to stimulate public opinion in favor of one hot dish to supplement the usual cold lunch.

To further school health, and as a "follow-up" after medical inspection, (all our rural schools were inspected) the first school nurse began

work in Toronto, Gore township. All credit for this work is given the late J. W. Stark. Children were given all the health drills on the list, taught breathing exercises, artificial respiration and the use of the triangular bandage. Personal hygiene, the care they should have of each other and the part even the smallest pupil plays in the spread or control of infectious diseases were dealt with. Mothers' meetings and home visits were by no means an unimportant part of the program.

What we were pleased to term "health" meetings, were held in school houses. At some points every ratepayer in the section was present. The agricultural representative, the school nurse and home demonstrator gave short addresses and the motion picture machine was used to good advantage. The mere fact of getting people together indicates a forward step. Boards of trustees are visited as time permits and improvements in ventilation, sanitation, water-supply, heating, lighting, etc., suggested. We find that most of them are willing to do at least part of what is required, just on having the matter pointed out.

Five larger and a number of smaller clinics—both medical and dental—have been conducted with the co-operation of institutes. At these, some three hundred pupils have received treatment. We have records of three hundred and eighty-five others having been taken by their parents to the family physician, dentist or oculist or to a specialist as a result of recommendations.

(3) RURAL HOMES. No systematic effort has been made to call on every homemaker in one township or in one section unless we wished to enlist sympathy in some campaign underway. A survey of conditions was always mentally taken. Questions as to what floor coverings to choose, how to remodel a house, how to install a bath-room and equipment, and everything from how to

feed the baby or plan the new house to the best way to clean a burned kettle have been asked. It is rather gratifying when one goes to a house to be told "we've just been waiting for you to call. There are four things we want to ask you about."

Demonstrations on table setting and service and decoration have been given. Home conveniences have formed the basis of many a conversation. Shortly after coming here a homemade fireless cooker was assembled. This perhaps was instrumental in making as many friends in the county as any other single thing. Then one comes in contact with so many intimate things one hesitates to write about. We do find that, in the main, the heart of the people is easily reached. The secret contained in the story we were familiar with in childhood "everybody's lonesome" helps greatly. In even the most unpromising beginning a point of contact can always be found. It happened to be potatoes with, I believe, the loneliest old soul I ever met.

Experience as a daughter of the Prairies and an Ontario farm has stood the home demonstrator in good stead. When people feel that you have lived the experience through which you endeavour to guide them, half your battle is won. While it is flattering to one's vanity and also necessary to the advancement of one's work to be received into homes where education and wealth are plainly the breath of life, our greatest accomplishment is bringing brightness into lives on back concessions.

(4) OFFICE WORK. Callers, phone calls and correspondence take considerable time but we wish to fill the place of a regular office adviser on all women's problems or at least act as the agent in a clearing-house for information. We have gathered a library of books, periodicals and bulletins. These are available to our women at any time. By a card index system a record of articles on farm

papers and magazines, bearing on our work, is kept. A display of labour-saving devices invites callers. Articles written for local papers keep the public informed.

Fall Fair Boards requested help in the revision of the women's section of their prize lists. In each case we endeavoured to replace the impractical with something of value. While we left enough entries in fancy needlework to satisfy the feminine mind, yet a kitchen apron or a house-dress made a better exhibit than some dead and gone piece of unusable Battenburg. At Streetsville we tried the plan of having one class open only to members of the junior institute without payment of further fee. This called out entries from younger women and girls who would not have thought of competing with professionals showing in other classes. Results from this experiment were most gratifying.

Demonstrations on food preservation and substitutes, home conveniences, children's diets, etc., have been given at all fall fairs. This year we had demonstrations given by teams in uniform.

School fairs have taken considerable time. We prepared sections on the prize list which might be considered as home economic classes. Many enquiries as to how to prepare exhibits were answered. Attended all our own fairs and judged at a number outside the county.

Child Welfare weeks have been put on successfully both years. The co-operation of all local doctors, women's organizations and the provincial Board of Health was secured. Our task lay in preparatory work.

A home economics short course for women and girls was held at the same point as the agriculture course given by the representative. We enrolled thirty-four students. To many, it was the only glimpse of college life they would ever know. Every effort was made to create that spirit. Sing-songs, a few exercises, class yells and combined classes and

demonstrations alternated with lectures kept every moment from becoming dull. A similar course will be conducted this winter.

At the present time the big project is the establishing of school nurse work on a county basis. Daily records of work are kept. Weekly quarterly and annual reports are sent to the provincial Department of Agriculture.

To be successful, home demonstration work must be carried on co-operatively with agricultural representative. No small part of the accomplishment here has been due to help received from the late representative, J. W. Stark, and to the Institutes Branch in giving the services of members of their staff for assistance with short courses.

NORTHERN PLANT BREEDING STATION AT FORT WILLIAM

HORTICULTURAL activities are progressing favourably at the Northern Ontario Plant Breeding Station which is situated on the Industrial Farm about ten

northern districts and the Plant Specialist at this Station has hopes of producing improved strains of first class quality heavy producers, some of which shall be especially suited to



CELLARS FOR VEGETABLES AND ROOTS AT THE INDUSTRIAL FARM NEAR FORT WILLIAM

miles south west of Fort William. The present season has been very open, there being about one hundred and twenty days free of frost at this Station. This promoted the maturing, and ripening of tomatoes, and practically all vegetables regularly grown in the cooler parts of Ontario.

Some very promising results are being obtained from experiments now being worked out with seedling potatoes. Potato seed apples form very abundantly on the plants in the

culture on clay soils. Records are being kept as to the number in a hill, depth of eyes, smoothness, and colour, and selections are being made with a view to obtaining an early white potato of quality and heavy yield, of the Green Mountain type.

Considerable success has been achieved in the production of vegetable seeds of various kinds at this Station. It has been found that the local grown seed produce plants of greater hardiness and earlier develop-

ment and maturity than can be produced from seeds imported from warmer sections. The accompanying illustration shows spinach from home-grown seed along with imported seed of the same variety. The difference between the rows is quite noticeable. Experiments with other vegetables have given similar results.

A very interesting experiment has been carried out this year in crossing pumpkins and squashes. The resulting fruits have shown the characteristics of both parents as well as of

plums from eighteen different sources in Ontario, Manitoba, and the northern States have been planted and several thousand seedlings are now being produced whose character and relative hardiness will be studied and recorded, and it is expected that a number of excellent varieties will be produced which may be used for grafting after their qualities have been ascertained.

The exchange of plants, shrubs, trees, etc., is being carried on between the northern States—North Dakota



CORNER OF THE GARDEN

many intermediate stages from a smooth skinned squash to a pumpkin with a rough warty surface and a decided "squashy" complexion. Citrons and other cucurbits have been successfully grown in large numbers at the plant breeding station this season and it is expected that on the new farm, which is to be acquired by the Department, much better results will be obtained as the lighter land will give earlier spring growth.

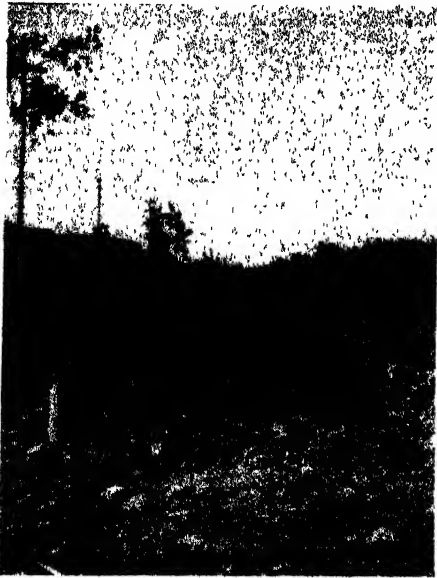
Further attempts are being made to develop the pomology of the north. With a view to this end the native

South Dakota, and Minnesota,—experimental stations in Canada, and the Fort William station. This exchange brings about a close relationship between the investigators and also provides new material of hardy sorts for propagation.

The city of Port Arthur this year chose, as their civic flower, a red sweet pea. As there are so many shades and variations it was thought advisable to select some definite variety. In order to make the selection, Mr. Leslie, the Plant Specialist, has tested forty different kinds at the breeding

station and the civic officials have been able to choose the most desirable one from among these.

Ornamental planting has been done at the Emo school in Rainy River District, the Neebing School No. 2



SPINACH "VICTORIA"

The central (advanced) row is from home grown seed while the rows on either side are from seed from other sources.

in Thunder Bay District, and it is planned to ornament the municipal grounds at Dryden in Kenora District in the spring of 1920. This activity

should have a marked bearing on ornamental planting of all grounds in these localities. Being public grounds they will serve well to demonstrate what can be grown for the beautification of homes and institutions in the north.

A very pretty planting scheme has been worked out on the grounds of the Industrial Farm and citizens from the cities of Port Arthur and Fort William have visited the Farm in large numbers every day during the summer, and many have gathered excellent ideas which they are working out in their home gardens. Most of the shrubs and trees grown are native to this northern district and show to good advantage when domesticated. Sugar maple seedlings are being grown from seed gathered from the trees which grow in sheltered places on the northern slopes of the mountains and it is hoped to evolve a strain that will prove hardy enough for ordinary use as shade trees on the city streets in the northern latitudes.

The land on which the breeding station is located is rather a heavy clay or clay loam and is probably two weeks later in giving spring growth than is some of the warmer loam and sand lands several miles distant. In all probability the permanent home of the plant breeding station will be in the Slate River valley where the soil is more suitable and transportation more satisfactory.

FARMERS SECURE CATTLE THROUGH GOVERNMENT

DURING the latter part of September the Ontario Department of Agriculture made an effort to assist the farmers of Thunder Bay district in securing milch cows of superior grade. Two car loads, made up of ten pure-bred Holsteins (9 females and 1 male) and twenty-nine grades, most of which were of Holstein breeding, were sent to Fort William, where they were housed in the buildings of the Industrial Farm. Through the agricultural represent-

atives, Messrs. G. W. Collins and L. M. Davis, buyers were located and brought to the Industrial Farm, where they were able to examine the animals and make satisfactory purchases. This arrangement gave good satisfaction, as the farmers were able to see what they were getting. To date seven of the pure-breds and twenty-three of the grades have been sold and it is expected that the balance will be disposed of very soon.

With the exception of four animals, which were sold for cash, the cows were sold on joint branch lien notes for twelve months' time at 6 p.c. interest. The animals were all numbered and their values were marked on the sheet kept in the represent-

atives' offices. This enabled prospect buyers to ascertain the prices of the various animals before they went to the Industrial Farm to look them over. This scheme has worked out well and has been the means of supplying a number of settlers with good foundation stock.

AGRICULTURAL REPRESENTATIVE CHANGES

THE following changes have recently been made in the agricultural representative service in Ontario. Mr. G. B. Curran, representative at Napanee for Lennox and Addington counties, has resigned to take charge of the seed and feed department of the United Farmers' Co-operative Company. Mr. Curran is succeeded by Mr. C. C. Main, who has returned from overseas service.

Mr. R. R. Fleming succeeds Mr. W. F. Strong at Burlington, as representative for the county of Halton.

Mr. M. C. McPhail, who has been serving at Port Hope, has returned to the Ontario Agricultural College to take his final year. He is succeeded by Mr. E. K. Hampson, formerly of Welland, who is succeeded by Mr. Geo. R. Wilson, formerly representative in Norfolk county, who has returned from overseas service.

MANITOBA

APPOINTMENTS AT MANITOBA AGRICULTURAL COLLEGE

AT a recent meeting of the board of directors of the Manitoba Agricultural College appointments were made to fill vacancies on the teaching staff. The new professor of chemistry is H. S. Hammond, of Macdonald Agricultural College, Quebec, who takes the place of Dr. Shipley, who is now a member of the faculty of Manitoba University. W. F.

Geddes, B.S.A., was appointed associate professor of chemistry, and Miss Kadlac, from the University of Minnesota, received the appointment of associate professor of household management. This is a new position of the Home Economics staff made necessary by the increased scope of the work. Miss Moxon, of Truro, N.S., is the new instructor in household science.

SASKATCHEWAN

POULTRY MARKET STATIONS

AS in former years, poultry killing stations have been opened at Regina and Saskatoon, where chickens, turkeys, and geese may be marketed. These stations are conducted by the Saskatchewan Co-operative Creameries, Ltd. As each shipment arrives at the station an advance payment is made to the

shipper, the final payment being made when the poultry has been marketed. The shippers receive the total selling price of the poultry less the cost of killing, storing, and marketing. The company is prepared to provide plans and instructions for the making of model coops for the shipping of the live birds.

ALBERTA

COMMISSIONER OF PROVINCIAL POULTRY BRANCH APPOINTED

BY JAS. MCCAIG, CHIEF PUBLICITY COMMISSIONER

MR. J. H. HARE, who has been Poultry Marketing Commissioner for the Alberta Department of Agriculture since July, 1917, has been appointed commissioner and head of the Poultry Branch of the Department of Agriculture for the Province.

In the past two years Mr. Hare has been giving his attention to the establishment of a good type of marketing service for poultry and eggs at both Calgary and Edmonton, and the work has expanded satisfactorily. He will now direct the general poultry interests of the province. He has charge of the provincial poultry plant, of the direction of all competitions, and of extension and correspondence work.

The extension work is regarded by Mr. Hare as of special importance, and he will in all likelihood undertake

useful expansions for the benefit of the industry. This will include the further improvement of marketing, the carrying on of general educational campaigns for better poultry keeping with the establishment of demonstration poultry houses in different parts of the province. It is probable also that special agents will be furnished to give direct assistance to farmers who request it in the management and care of flocks for a period of two or three years, with a view to encourage the reaching of a better standard of efficiency in poultry work.

Previous to coming to Alberta, Mr. Hare was engaged in poultry work in Prince Edward Island, as an officer of the federal Live Stock Branch and had an important part in putting the industry on the satisfactory basis on which it now stands in the Island Province.

ALBERTA STEERS FOR THE INTERNATIONAL SHOW

BY A. A. DOWELL, PROFESSOR OF ANIMAL HUSBANDRY

IN the fulfilment of a plan proposed by the University of Alberta to the Alberta Cattle Breeders' Association, the university has undertaken the fitting of an exhibit of steers for the International Live Stock Exposition to be held in Chicago in 1920. These steers, twelve in number, consisting of six Herefords, five Aberdeen Angus and one Shorthorn have been contributed by breeders of these respective breeds of cattle. The animals will be used by the college of agriculture for demonstration class work. They will thus take the place of ordinary grade steers that would otherwise be kept by the university for students judging material. The university accepts the animals, furnishes the necessary labour, feed and nurse cows and such other require-

ments as are necessary to properly fit the cattle for show. Most of these calves are already at the university. Cards will be tabled in the university barn showing the name of the breeder and parentage of each of the animals. Prior to the date of showing a committee will be appointed by each breed association represented to eliminate any calves which, in their judgment do not show sufficient promise to send to the international show. All the calves will be shown individually in their respective age classes. It is felt by those responsible for this undertaking that if the steers make a creditable showing in Chicago it should prove an excellent advertisement not only for the breeders donating the calves but for the province as a cattle-producing country.

STALLION ENROLMENT IN CANADA

IN all the provinces of Canada, stallion enrolment now exists.

The returns from each province (except Quebec, whose returns are made at the end of the year), for the present year have been received and

the following table compiled in the office of THE AGRICULTURAL GAZETTE. This table gives the number of enrolments made during the present year in each province and classifies the animals according to breed.

Pure Breds.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.	Breed totals.
Clydesdale	20	29	59	...	976	469	1,316	459	48	3,376
Percheron	3	10	32	...	326	196	817	511	21	1,916
Shire	...	...	1	...	32	14	37	38	4	126
Suffolk	...	...	3	...	3	4	19	15	4	48
Belgian	...	...	1	...	21	29	171	104	3	329
French Draft	...	...	...	...	...	...	...	...	5	5
French Canadian	...	2	4	...	6	3	...	...	...	15
Standard Bred	18	36	18	...	286	14	39	15	8	434
Thoroughbred	...	...	...	...	19	...	2	11	9	41
Hackney	...	2	4	...	47	9	15	3	8	88
French Coach	1	...	...	...	2	1	1	...	2	7
German Coach	...	...	...	...	6	2	1	...	...	9
Saddle Horse	...	...	...	...	...	...	...	...	...	0
American Trotting	...	...	...	...	...	...	...	...	5	5
Morgan	...	...	...	...	...	...	...	1	...	1
Irish Hunter	...	...	...	...	...	...	1	...	...	1
Ponies and Morgans	...	...	...	...	5	...	...	...	...	5
Jacks	...	...	...	...	...	...	2	...	...	2
Interim Enrolment Certificates— Pure Bred	...	...	...	...	...	...	...	270	...	270
Totals	42	79	122	...	1,729	741	2,421	1,427	117	6,678
Grades	34	52	126	...	...	...	442	299	...	953
Interim Enrolment Certificates— Grades	...	...	...	...	...	...	...	99	...	99
Scrubs	...	44	...	...	...	...	...	...	...	44
Total number of horses enrolled in each province	76	175	248	...	1,729	741	2,863	1,825	117	7,774

"Your duty is to give to your country the kind of education which is now needed. We were never so much as now in need of intellects trained for individual judgment, capable of reaching decisions for reasons of their own, autonomous and apt to take the initiative; we must have, and in large numbers, strong individuals. You will meet, therefore, entrenched behind time-worn customs and practices, this old enemy, educational passivity. . . . It is fit that the curiosity of the Frenchman of tomorrow should transcend limited horizons and embrace the whole of the earth. . . . Please meditate this saying of Michelet's: "Teaching consists in communicating the intimate part of man."—Professor Lavissee, Director of the "Ecole Normal Supérieure" of France.

PART III

Junior Agriculture

DEMONSTRATIONS, COMPETITIONS, AND CLASS-ROOM STUDIES IN RURAL
LIFE FOR BOYS AND GIRLS

SCHOOL FAIRS IN 1919

PRINCE EDWARD ISLAND

BY W. BOULTER, RURAL SCIENCE BRANCH, DEPARTMENT OF AGRICULTURE

SCHOOL fairs as a part of the agricultural training in the rural schools were not organized in this province until 1916. As an experiment, four fairs were started. These were so well received by the districts that the following year saw the number increased to 14. In 1918 the number was again increased to 29; and this year to 40.

The objects of these fairs are as follows:

1. To interest the children of the schools in the things which are grown on and about the farms.
2. To encourage the production of produce of better quality.
3. To train pupils to enter into friendly competition.
4. To join up the school and home more directly.
5. To produce better educated boys and girls.

The organization was carried out as follows:

1. The public school inspectors of whom there were eight, assisted the teachers in their organization.
2. A number of schools, from 4 to 7, group into one fair centre.
3. Three pupils and one trustee from each school, with the inspector, form an advisory committee. Officers from each school are appointed, a prize list drawn out, and all arrangements are completed in the spring in order to give the pupils an opportunity to prepare exhibits.

The Department of Agriculture, through its Rural Science Branch, assists the organization: 1st, by supplying a school fair circular containing a suggestive prize list; 2nd, supplying all material required at the fair, such as the secretary's entry book, entry tickets, prize tickets, officers' badges and ribbons for the sports; 3rd, competent judges in live stock, vegetables and domestic science are sent to each fair. The inspector judges the school work.

No grant as yet has been paid for prizes. The prize money is made up by the schools in various ways, by holding entertainments, selling candy, special contributions, etc. The generous action of the Canadian Bankers' Association in giving \$30 for calves and pigs when exhibited according to their regulations, is highly appreciated and has resulted in great benefit to the live stock industry. It has also suggested to dairy companies a way in which they too could assist in developing their industry, and in 1918 the Tryon Creamery donated \$25 in prizes for dairy calves. This year the amount was increased to \$75 and a like amount was voted by the Crapaud Creamery. As a result there was the finest exhibit of dairy calves and yearling heifers, all under 18 months, shown at the Tryon School Fair ever brought together in the province. The interest is extending. The Dunk

River Creamery this year voted \$28 for the same purpose. We cannot attach too much importance to these contests. The boys in striving to win learn to feed, care for and exhibit, and become intensely interested in live stock. The boys of to-day are our future farmers, and as the prosperity of an agricultural country depends on its live stock there arises the necessity of giving every possible encouragement to an education that will foster the future increased development of this main industry.

It is gratifying to note the increased interest taken by parents and children in the fairs. The improvement in the exhibits, the better arrangement and management in holding the fair, the friendly spirit shown in the sports, and best of all the evidence that each year the exhibits represent more individual effort on the part of the pupil. The individual effort is further encouraged by the organizing of Pig and Poultry Clubs, which contribute to the exhibits.

NOVA SCOTIA

BY L. A. DEWOLFE, B.A., B.S.A., DIRECTOR

THE present year saw a slight increase in the number of school fairs over the previous year. Last year 230 schools exhibited

Poultry exhibits were more common. At one local fair, Westville, Pictou county, there were 75 entries. At practically every fair there were



A SCHOOL PARADE AT THE CHILDREN'S EXHIBITION, BEAR RIVER, N.S. SEPTEMBER, 1919

their produce. This year the number was increased to 250.

Comparatively little live stock was exhibited, except at local fairs. This is due to the difficulty of transportation. At a few local fairs, however, the live stock exhibit was excellent.

from half a dozen to a dozen entries in poultry.

Vegetables still continue to be the main feature of the children's exhibitions. Flower exhibits are small for two reasons: First, the fairs are usually held so late that many of

the flowers are gone. Second; they are so hard to ship that most of the children will not bother with them. Where children live near enough to carry their exhibits, however, there is usually a fair showing in this line.

Collections of weeds and insects are common, but they are usually not educative. The teacher herself, is often ignorant of the names of the common weeds and insects; therefore the children bring an unnamed heterogeneous mass without any attempt at classification.

Manual training is generally neglected. This is partly because our prize list has not named anything definite to be exhibited. Of course, in towns where there is a manual training department, this is a live feature of the exhibition.

At all schools, however, sewing and cooking are big items. This is probably explained by the fact that our teachers are young women, and so more competent to deal with this side of the work.

Our biggest advance this year was in the line of recreation contests and sports. In no less than three dozen schools were these features introduced for the first time. The school parade was a popular part of the programme of district exhibitions. Public speaking contests elicited much favourable commendation. Judging contests were among the most educational features. Of course the ordinary sports were popular with the children. They did much to foster the right kind of school spirit, for each child was working for his school rather than for himself.

QUEBEC

BY J. EGBERT MCOUAT, B.S.A., EX-DEMONSTRATOR TO RURAL SCHOOLS

(ENGLISH SCHOOL FAIRS OF 1919)

THE school fairs, now regarded by the pupils of many of our schools as annual events of great importance, have again been held throughout the province. The anticipation, the excitement, the competition and the disappointments experienced by the boys and girls have died away, but many, no doubt, are looking forward again to that "day of days" when father and mother will take the whole family out to inspect the exhibits, visit the neighbours and perhaps see one of the family win a prize.

This year twenty-five English fairs were held in different parts of the province, as compared with twenty-three fairs the season before. Fairs were held at all the old centres and new fairs were held at Bishop's Crossing in Wolfe county and at Inverness in Megantic county.

Under new arrangements made last winter, the Department of Agriculture at Quebec took over the complete organization of French fairs, so

that this year only English school fairs were held co-operatively by Macdonald college and the pro-



J. EGBERT MCOUAT, B.S.A. EX-DEMONSTRATOR
TO QUEBEC RURAL SCHOOLS

vincial demonstrators. The demonstrators have complete charge of all fairs in their districts, but the rural school department of Macdonald college has co-operated to the extent of arranging for seed and eggs required by them, supplying all forms, bulletins, and entry systems, as well as providing judges on the occasion of each fair. This year seventeen fairs were under the control of



FIRST PRIZE BIRDS AND THEIR OWNER
WEST BOLTON

This coop though rude is comfortable and is constructed so that light is freely admitted

demonstrators and eight were directly controlled and operated by the rural school department.

It is difficult, in describing the fairs from year to year, to vary the description very much, as conditions and results have been, to some extent, the same. As in 1918, many parts of the country were again

visited with frost in late June, causing serious damage to, and in some instances the entire loss of, the school fair plots. Again in September the weather was very unfavourable for the first two weeks, thus affecting the attendance at many of the fairs.

The exhibits at the fairs showed considerable improvement in preparation and attention to details. This condition applied especially to cereals and there were a great many attractive exhibits of sheaves of wheat, oats, barley, and grain corn. The season has evidently been a favourable one for most of the grain crops, judging from the quality and quantity of the classes shown. Many of the sheaves would certainly surpass the average sheaf shown at our country fairs. Perhaps the finest exhibit of grain corn seen this season, or any other season, was shown at Dunham school fair. The boys who grew this corn did not merely bring out "corn," but they brought out *good* corn. Moreover, the plots from which they brought it were excellent and received much care throughout the summer. At some fairs there were very good exhibits of beans, and some classes, where there were twenty or more exhibits of uniform, ripe beans, worried the judges not a little. Some of the best exhibits of grain were shown at Richmond and Ayers Cliff. Good exhibits of beans were shown at Lachute, Huntingdon, Brome, and Ayers Cliff.

As usual, the horticultural exhibits made up the biggest section of all school fair exhibits. Owing to the frost, the sweet corn shown was variable in quality, but at many fairs there was a very strong showing. Beets were shown in large numbers, and this season the exhibitors showed that they had profited from the advice given at last year's fairs for the specimens brought out were, on the average, much better selected. It was around the pecks and plates of potatoes, however, that the greatest interest centred and many opinions as to who would be the winner were

expressed. The exhibits at Ayers Cliff, Richmond, Dunham, West Bolton, Clarenceville, and Waterloo were especially good.

Flowers do not make the showing at most fairs that would be expected. Although there is a large number of pupils every year who take flower seed, the results are not proportionate. Practically every fair has some exceptionally good exhibits, but the percentage of exhibitors is very low. This state of affairs only shows that more attention in general requires to be given to flower culture in and around the homes of our country districts. Are we not very often too practical and not artistic enough in the treatment of our country homes and their surroundings?

A decided improvement was evident this year at most fairs in the quality of the poultry shown. In addition, the average number of birds per setting was higher and at some fairs was as high as 7.6 chickens from a setting of twelve eggs. In general, the birds were exhibited this year in more comfortable and better built coops.

Bishop's Crossing and Lachute competitors deserve special mention for the way in which they exhibited their birds in boxes built according to the directions given out by the poultry department. In some cases the birds were badly crowded and could not be judged to advantage. This condition is, we are glad to say, becoming less evident every year.

The miscellaneous exhibits were often keenly contested especially in the section calling for the best collection of vegetables. The manual training sections brought out everything from bread boards to milking-stools. If there is one variety of stool there must be at least one hundred. The boys brought in every conceivable style, shape and size. It must be admitted that fortunately most of the stools would prove fairly useful and durable, although it would require considerable strength to handle some of them.

The domestic science section provided some surprises this year, for some fairs that had not done very well before furnished quite an attractive exhibit, whereas others did not come up to the standard of former years. The premier exhibition this year was undoubtedly shown at Ayers Cliff where exhibits of canned goods, bread, cake and sewing were very numerous and of high quality. Among



A PROUD BOY AND DESERVEDLY SO, MAPLE RIDGE SCHOOL FAIR 1919

other fairs that had good exhibits were Richmond, Waterloo, Bishop's Crossing, Dunham, Campbell's Bay, Shawville and Bury. The ladies in charge of the extension work along these lines deserve great credit for the results which have been achieved.

It is impossible in an article of this nature to describe each fair in detail. It is safe to say, however, that every fair accomplished some good, while

others did a great deal to supply the pupils of the district with work which appealed to them. One pleasing feature this year was the great enthusiasm shown at some of the smaller fairs. The people of Campbell's Bay, Quyon, Bishop's Crossing, Luskville and Inverness seemed specially interested in the work of the fair.

At several of the fairs lunch was provided for the judges by the home makers' club or by the people of the district. These clubs are fast becoming a power for good in the country and are doing a great deal to improve conditions in the community and the home.

A programme of sports was held this year at most fairs where a good day was provided. These sports are fast becoming popular but very many of the boys and girls are pitifully ignorant of the essentials of play or sport. It is time that more attention be given to the physical welfare of the pupils and more encouragement given to athletics of a simple nature

which can be played on any ordinary school ground. We have many difficulties to overcome in order to bring this about but the results would be worth while.

The demonstrators and others in charge of school fair work owe much gratitude to the teachers, pupils, school boards, homemakers' clubs, and other interested persons who have helped so loyally in the school fair work of the past year. They also are indebted to the provincial department of agriculture and to the various departments of Macdonald college for much assistance. Special thanks is tendered the demonstrators of the school of household science, Macdonald college, who during the past year have worked untiringly in the interests not only of the homemakers' clubs, but of the girls attending school. They have given scores of demonstrations and have often suffered much inconvenience and trouble carrying out their duties.

MANITOBA

BY S. T. NEWTON, DIRECTOR, AGRICULTURAL EXTENSION SERVICE

THE splendid working arrangement which has been in operation for the past three years whereby boys' and girls' club work and school fairs are carried on co-operatively by the Departments of Education and Agriculture is still giving good satisfaction.

The territory in charge of each inspector is taken as the unit for organization purposes, and the inspector recognized as the natural club leader for his district. He decides on places where the fairs are to be held, and arranges them in a circuit so that the same judges can be present at all of the fairs.

While on his regular rounds he re-organizes most of the central and branch clubs. He is present at all of the fairs, and either judges the school work or arranges for competent judges to take his place.

The Inspector's Association has a live boys' and girls' club committee, and as soon as the fairs are over they get the opinion of the other inspectors, and then co-operate with the extension service in working out the succeeding year's program.

An organization circular, containing general instructions and a suggested prize list, was printed early in the year and sent to all teachers in the province. As soon as branch clubs were organized, record books were distributed for each contest or project. These record books contained, in addition to space for the record, the rules governing the contest, as well as considerable instruction in regard to the project itself.

During the year from eight to eighteen members of the extension staff are in the country during the

whole year. Each one is familiar with all branches of club work, and always make it a point when near a school to call for the purpose of answering any questions that may be asked, or assisting in any other way desired by the teacher.

Occasionally an inspector finds that it will not be possible for him to reach certain schools in time to organize the club, in which case he communicates with the extension service, and a strong effort is made to have someone present at the organization meeting, either a regular member of the staff or a live club manager from some other club.

About three weeks before the fairs are held, posters giving the dates and other information are prepared for each inspector division and sent to the club managers for distribution. Shortly after this a full supply of officers' ribbons, judges' books, entry sheets and tags, prize cards and report forms, and community songs are sent to the managers.

The extension service provides from two to five judges for the agricultural and home economic exhibits. While the judging is being done a live committee runs off a good program of sports. As soon as the judging is completed, both pupils and parents assemble in the school or a public hall, when the awards are explained by the judges, and brief addresses are given by judges, club members, officers and others.

About a month after the fair is held, many of the clubs hold a big boys' and girls' club rally when the presentation of awards is given a great deal of prominence.

Money prizes are not emphasized, but each club manager, has a good respectable prize list, no very large prizes are offered, but an effort is made to recognize real effort by having a large number of prizes in each class rather than a few large ones.

Generally the trustees for each rural school and each room in a

graded school contributes from \$5 to \$10 for prizes, and this is supplemented by an equal amount from the Department of Agriculture.

There were 220 central clubs, 1,200 branch clubs, and 26,500 members. Practically all of the clubs held fairs, and although over 60 per cent of the clubs encountered wet weather, the attendance of adults was over 30,000, and children over 35,000.

The total number of exhibits was, pigs 887, calves 871, sheep 356, colts 255, poultry 4,433, weeds 1,169, sewing 8,215, cookery 9,792, dairy 1,330, vegetables 9,433, grain 1,100, canning 4,721, woodwork 1,553, records 2,257, school work 27,601.

The big event of the year is the trip to Winnipeg which was made on November 10th by fifty-five of the club champions who were the guests of the T. Eaton Company, the Canadian Bank of Commerce, and the Department of Agriculture. They spent the whole week in sight seeing, entertainment, and instruction and have returned to their homes to encourage their team mates to greater efforts.

Plans are about completed for next year's work, and the principal changes are as follows:—

Two members of the extension staff will devote all their time to club work. Henry E. Wood, a graduate of the Manitoba Agricultural College, will have general charge, while Miss M. Speechly, also a graduate of the Manitoba Agricultural College, will look after the girls' side of the work.

Considerable attention will be given to team demonstration work in such projects as garment dyeing, bread baking, canning, sewing, milk testing, stock judging, vegetable judging, etc. Public speaking will also be emphasized, and an effort made to provide a program for the last hour each Friday on some phase of club work.

SASKATCHEWAN

BY H. A. MCLEOD, EDITOR OF PUBLICATIONS

FROM 200 to 225 school exhibitions were held in Saskatchewan this year, a marked increase over 1918, with a corresponding improvement in the quality as well as in the number of exhibits. In practically all instances where boys' and girls' clubs are in existence, the club fair is held in connection with the school exhibition.

It is the policy of the Department of Education to send at least one judge or speaker to each of the school exhibitions held, and, with very few exceptions, judges and speakers have been provided for the exhibitions this year, adding very greatly to the interest and the value of these gatherings. Those not receiving assistance have been small exhibitions, except in rare instances where conflicting dates made it impossible to secure judges.

In addition to this outside help, the school inspectors in whose territory the exhibition is held, invariably attend, and it is largely due to their efforts that the movement has attained its present success.

EXPERIMENTS IN ORGANIZATION

Some interesting experiments have been tried out this year in connection with the organizing of school exhibitions. In the Prince Albert inspectorate a series of small local exhibitions in each municipality has been arranged with a large central municipal exhibition, where the winners from the locals compete. Eight locals held exhibitions in the Prince Albert rural municipality, and great interest was taken in these small exhibitions, as well as in the larger municipal exhibition held on September 27 at Prince Albert. Rozilee rural municipality is trying out the same plan with seven small exhibitions, with a large central municipal exhibition at Shellbrook.

Following these exhibitions, when the teachers' conventions are held, exhibits selected from the municipal centrals will be shown, so that the best of the work by pupils in the entire inspectorate will be on display for the teachers to see and compare.

NOVA SCOTIA

HOW RURAL SCIENCE METHODS HELP

FROM NOVA SCOTIA RURAL SCIENCE BULLETIN

THROUGH rural science we hope to link up school life with home life. We try to make lessons practical instead of bookish. Arithmetic in the abstract is unattractive; but when a boy has to calculate the amount of fertilizer or quantity of seed required for his own garden, he sees the necessity of arithmetic, and uses it not as a task, but as a utility. Arithmetic taught practically is mastered; that taught theoretically is soon forgotten.

Similarly, the English composition of the average school child is stilted and wretchedly bad, because he gets

no practice whatever in writing his own thoughts. An assigned topic to be read and epitomized, usually bears the ear marks of the original; but an assigned topic from the child's own daily activities will be written in a clear and natural style. How much better a child can write about his garden, or his chickens, than he can about William the Conqueror, or the national policy.

Rural science aims, through the teacher, at getting the children to make gardens, care for farm animals, exhibit their products, can their vegetables, do plain sewing, cooking,

and other handwork. Based on these activities which are vital to the child, the teacher will frame exercises in arithmetic, geography, history, drawing, bookkeeping and English—all of which cease to be abstract drudgery, and become a necessary part of life.

Rural science is a *method*, not a

subject. It educates the child through his interests and his hobbies. It creates an interest in outdoor and home activities, and then uses these acquired interests as centers about which to cluster all school subjects. A subject that does not touch life at any point is useless; for life after all, is what interests us.

ONTARIO

GRENVILLE COUNTY CALF CLUB

THE Grenville County Calf Club established last spring by boys and girls under the agricultural representative, W. M. Croskery, B.S.A., has given very satisfactory results. In all fifteen heifers were secured, fourteen of which were distributed to members of the club and the fifteenth was in such poor condition, owing to a long journey and hardships enroute, that it was refused by the boy who drew her number. Of the fourteen heifers distributed eleven went into grade herds where they received only ordinary care and feeding. Practically all of the ani-

mals were in poor condition when purchased and some remained unthrifty all summer and consequently did not make good records. However the accompanying table supplied by Mr. Croskery shows that keen interest was taken by members of the club who kept accurate records of milk and feed. This club has been very successful and it has afforded exceptional opportunities for boys and girls of the county to get high class Holstein heifers at moderate prices. The following table gives not only the amounts of milk given by each heifer in the various tests but also shows the prices paid.

Heifer No.	Price	Best 1 day.	Best 7 days.	Best 30 days.	Best 60 days.
	\$	Lbs. milk.	Lbs. milk.	Lbs. milk.	Lbs. milk.
1.	175	42	287	1,160	2,196
2.	205	44	280	1,200	2,300
3.	150	30.5	199	775.7	1,439.2
4.	150	30.8	178.4	723.8	1,357.4
5.	180	40	266	1,071	2,049.2
6.	250	62.5	385	1,591	3,138
7.	150	41	276	1,133	1,996
8.	190	41.2	276	1,071	2,131.2
9.	220	34	228.5	897.7	1,793.7
10.	210	34	239	876	1,474
11.	185	42	282.5	1,149.5	2,157
12.	170	32			
13.	150	37	248	1,048	2,049
14.	190	47.5	323.7	1,357.2	2,569.5

Of the fourteen heifers distributed all have at one time in their lactation period given over 30 pounds of milk a day; eight have given over 40 pounds a day, and one has given as high as 62.5 pounds in one day.

This heifer is the only one of the fourteen in official Record of Performance work and she is making a very creditable showing. She freshened a few days before she was two years of age.

It is worthy of mention that the fifteenth heifer which was so thin and appeared so wretched on distribution day that the boy who drew her number was not allowed by his parent to accept her, has also been heard from. She was purchased by Principal Bell

of the Kemptville Agricultural School. He showed her bull calf at the Central Canada Exhibition, where it won first in a strong class, among which was the reserve champion of the Canadian National Exhibition at Toronto.

PEEL COUNTY SHOW AND SALE OF CLUB HEIFERS

A year ago when the Peel County Dairy Calf Club was organized fifty-eight dairy heifers were distributed to the members. An account of the distribution appeared in *THE AGRICULTURAL GAZETTE* for December at page 1161. On October 14 this year fifty-five of these heifers, now rising three years old, were shown in competition and afterwards sold at Brampton by auction. The animals included nine pure bred Holsteins, eleven pure bred Jerseys, and of grade animals, three Jerseys, twenty-five Holsteins, and eight Ayrshires. The show provided classes for Jerseys, Holsteins and Ayrshires. The prizes ranged from \$10 to \$1, with a championship award

open to all. Each class was open to both pure breeds and grades of the breed. Awards were made on the following basis: 1, Record of feed and milk production, 25 per cent; 2, Condition of animal, 50 per cent; 3, Training and showing, 25 per cent. The sale conditions allowed club members to bid for their own or other animals. The animals were sold on a cash basis. When the animals were distributed to the members last year a twelve-month note was given. The girls and boys have fed, milked, and cared for their heifers throughout the year and while doing so have studied the feeding and management of dairy cattle. They have kept records of the feed and also of the milk and butter fat produced.

SASKATCHEWAN

SCHOOL CONTESTS

AT the time of the annual meetings of the Rural Educational Associations in Weyburn Inspectorate during November the following contests were held:

Memory gem tests for grades 1, 2, and 3.

Speaking contest for grades 4, 5, and 6.

Spelling contest for grades 7 and 8.

The rules governing these contests were outlined in a circular sent out

by A. Kennedy, M.A., Inspector of Schools in the Weyburn Inspectorate, and the time and place of the annual meeting and school contests were arranged by the executive of each rural educational association. The awards of gold, silver, and bronze pins or medals were given to the winners of first, second, and third places in each of the contests. Placing was made according to the schedule of points suggested in the circular.

PART IV

Special Contributions, Report of Agricultural Organizations, Publications, and Notes

CITY MARKETS

It is constantly being pointed out in the press that the city market, where farmers bring their produce for direct disposal to the consumers in the city, is a great factor in maintaining fairly normal prices for farm produce. In order that we might bring together the policies and methods under which the farmers' markets in the more important cities of Canada are operated, letters addressed to the mayors of a number of cities were sent out from the office of The Agricultural Gazette. These letters suggested that the subject should be dealt with according to the following points:—

1. Days and hours of selling; 2. Privileges granted to hucksters; 3. Privileges granted to merchants, such as butchers and grocers; 4. Arrangements for the comfort and convenience of sellers and buyers as regards allotment of space, stalls, etc.; 5. Are stalls or stands sold or reserved? 6. To what extent is selling done from wagons? 7. Covering—to what extent is the market covered and with what success? 8. Arrangements for the classification of products such as meat, dairy produce, poultry produce, and vegetables; 9. Provision made for the instruction of growers in the preparation and exposure of their produce; 10. Any system whereby produce can be shipped in by producers to be sold for them; 11. What are the duties of the person in charge? Is he active in any way in increasing the business done on the market?

The following replies show the progress the city markets are making in the leading centres of Canada, and indicate the importance of the direct relationship established between purchaser and consumer through this medium.

HALIFAX, N.S.

BY W. E. MESSERVEY, MARKET CLERK

Our market is open only on Friday afternoon and Saturday morning, but it is the intention to have it in operation daily in the near future. At present it is occupied by the country people who sell vegetables,

meats, eggs, etc., and during the proper season, lobsters, eels, fish, etc., are disposed of to the consumers here. It is expected that the market building will soon be in condition and we will then be able to go ahead and have a real city market.

MONCTON, N.B.

BY J. S. MCGEE, CITY CLERK

Our market is open every day in the week from 7 a.m. to 5 p.m., and until 10 p.m. on Saturday. No privileges are granted to hucksters, and merchants are not allowed to do business in the market but can buy produce to sell again after 12 o'clock noon. The market clerk allots the space at the counters and tables and no selling is done from the wagons.

The market building is all concrete and is a fair size, with a concrete floor, which is

occupied with counters and tables. The building is heated by gas and equipped with rest rooms.

We have no scheme for the classification of farm produce nor is any provision made for the instruction of growers in the preparation and exposure of their produce. We have not adopted any system for the sale of produce which has been shipped into the market. Each purchaser sells his own goods.

LANDSDOWNE MARKET, SHERBROOKE, QUE.

BY A. C. SKINNER, CHAIRMAN, MARKET COMMITTEE

Despite the objections of farmers and a few city people we welcome hucksters to our market, believing that much more produce is offered for sale on account of them being here with a resultant lower price. One huckster, a country store keeper ten miles from here, buys from two hundred and ninety farmers; he sells some of his goods in Montreal but most of it here. He frequently disposes of 1,800 to 2,000 pounds of butter, besides quantities of poultry and eggs, and is always sold out early Friday evening. Hucksters are charged about one-third more than farmers for the same amount of space.

We have a few merchants selling teas and

tor, Dr. A. W. Tracey, who is continually urging vendors to bring better produce and meat. He instructs them how to display it in a more attractive manner. Already we have succeeded in getting many to fix up their stalls, to install show cases, etc., and generally to show a more tidy and attractive appearance of person and product.

In addition to the official in charge of the market we have two caretakers who attend to repairing and cleaning the premises. On the market days, which are Fridays and Saturdays (the Friday evening market being very popular) we have two clerks who allot space, collect fees, sell paper bags, etc. The food inspector is on duty on these two days



PART OF THE LANDSDOWNE MARKET IN THE CITY OF SHERBROOKE

canned goods but this innovation has met with considerable opposition from city merchants. On account of the cash and carry plan goods are sold lower than in stores and the buying public seem pleased with the few stores of this kind which we have.

We reserve space for regular attendants so that their customers may easily find them. Neither seats nor benches for vendors are provided as there is not sufficient space. Stalls and stands are rented by the week and may be reserved one week in advance. There is very little selling from wagons except in the fall when the market is very crowded, all prefer to get inside. Most of our market is under cover and heated which adds to the comfort of all, particularly in wet weather.

A considerable attempt has been made in instructing the producers by our food inspector

each week inspecting meat and other products and adjusting differences between buyers and sellers. There is also a policeman in charge of a high class computing scale where people come with their products and verify weights and amounts paid. If there is any shortage the policeman goes with the complainant to the vendor and has the difference adjusted. This is a very valuable feature. Two additional policemen are on duty in the market square and in co-operation with the others above mentioned they enforce the anti-smoking and spitting by-law and keep a look out for forestallers and thieves. The market committee has popularized the market by keeping it clean, making improvements, inaugurating an evening market, and by keeping the market before the public by frequent write-ups in the press.

In all there are eight buildings in connection with the Lansdowne market. These are the main building, 107 by 58 ft. solid brick in which are the regular butcher stalls,

new solid brick addition 107 by 25 ft. for meat vendors has a storage cellar where space is rented. The hide house 15 by 30 ft. with solid cement foundation and floor is occupied



BUTCHERS' STALLS IN THE MARKET, SHERBROOKE, QUE.



A CORNER IN THE MARKET BUILDING AT SHERBROOKE, QUE.

another building of solid brick, 107 by 60 ft. in which vegetables, butter and eggs are sold, and a wooden building 80 by 40 ft. where country butchers sell meat and poultry. A

on market days by hide buyers. A small brick house for the use of carters, a sheltered and covered platform 13 by 100 ft. for use in summer and fall months, along with an

incinerator make up the remainder of the buildings.

A complete system for the collection of fees has been adopted and arrangements are made whereby purchasers are supplied with paper and bags at a nominal price. We insist on meat and produce being wrapped in clean paper instead of old newspapers as formerly.

The following figures for the attendance and revenue are for the two market days, Oct. 10th and 11th and represent rather more than an average week but not by any means our largest week. Meat vendors 119, farmers 150, hucksters and merchants 38. Total receipts for rental fees to October 15th amounted to \$11,646.85, running expenses are about \$4,000 per year.

Delivery boys, who frequent the grounds on market days with small delivery wagons soliciting the delivery of market baskets, are required to register at the police station and procure and wear a numbered badge for which they are charged 25c. Previous to this arrangement we had many complaints of the non-delivery of goods entrusted to the boys.

A box for the reception of suggestions and complaints is installed in a prominent place and the slips are periodically brought to the chairman of the market committee. We have

a regular lunch room in one of the buildings where anyone can get a good hot meal. We also have ice water taps in hot weather and we arrange to make what improvements we can for the convenience and accommodation of our patrons from time to time.

Generally speaking meat is plentiful and of good quality and very reasonable in price on this market, largely due to the efforts of our food inspector, Dr. Tracey, who has given particular attention to this department. Butter and eggs, cheese, maple sugar, etc., are plentiful and of good quality, the prevailing prices here being slightly lower than in Montreal for similar goods. Vegetables and farm produce are not produced in sufficient quantities locally and consequently prices rule higher than in Montreal.

Lansdowne market is extensively patronized and much interest in it is taken by the public, who frequently make helpful suggestions as to its management. It has been somewhat difficult to always preserve peace and harmony amongst the various factions operating under such congested conditions. At times it has been necessary to enforce regulations even to the extent of arrest and fining of the offenders. Strict impartiality is observed and this reputation for fairness has greatly assisted the management.

THREE RIVERS, QUE.

BY A. BELIVEAU, CITY CLERK

The following information taken from the by-laws and regulations covering the public market for Three Rivers gives in detail all essential facts in connection with the public market of this city.

The market is open to the public every day, Sundays and holidays excepted, from 4 a.m. to 8 p.m. from the first of April to the first of October, and from 6 a.m. to 6 p.m. for the balance of the year.

No one is allowed to offer for sale in any street, shop, or other place in the city, except on the public market, any kind of fresh provisions, butchers' meat, pork, fowl, fish, fruits, grains, vegetables or other food stuffs. However nothing in the present regulations prevents store keepers from retailing in their shops butter, eggs, fresh meat, vegetables, etc.

Persons selling meats must first obtain a special license from the secretary-treasurer

on payment of a fee of \$1.00, and all cutting and weighing of meat must be done at the weigh office established in the market, or in the butcher shops of the city. The butcher stands are let by public auction between the first of January and the first of May in each year. There is a tax for all other stands.

It is the duty of the market clerk to separate as much as possible stalls for the different classes of produce, and to keep together dealers in each specific kind of produce. The clerk also collects taxes and maintains order in and about the market.

The hall in which the market is held is a covered building but is not heated. No provision is made for the instruction of growers in the preparation of their products and we have no system whereby producers can ship their goods to market to be sold for them.

MONTREAL, QUE.

BY J. E. A. BIRON, SUPERINTENDENT OF MARKETS

In Montreal there are six public markets where meat and farm produce are sold to the citizens. These markets are Bonsecour, St. Lawrence, Ste. Antoine, St. James, St. Jean Baptiste, and Maisonneuve. These

are under the care and supervision of a superintendent, appointed by the city council, whose duty it is to enforce and carry into effect the by-law concerning markets, and orders of the market committee.

Clerks are appointed for the administration of the different markets, fish markets, and public weighhouses, and are sworn as special constables. They are in constant attendance at their respective markets during market hours and it is their duty, under the control of the superintendent, to inspect all articles, provisions, etc., to classify the various denominations of vendors, to arrange contiguously all those who deal in articles of the same kind, to arrange and assign a place to all vehicles brought by vendors, and to allot the space on which vendors may expose their produce. They also attend to the weights and measures of articles, and enforce all rules and regulations for the government of their respective markets.

Three-fourths of the vegetables consumed in the city of Montreal are sold from the wagons on the city markets. Farmers and gardeners are allowed to sell in their carts along side of the platform and sidewalk

surrounding the markets. Some of these platforms are sheltered and some are not. No stalls are put at the disposal of the farmers. The stalls inside the markets or surrounding them are rented to traders only. No privileges are granted to hucksters, butchers, or grocers.

In the Bonsecour market we have two large halls which measure 175 feet long by 50 feet wide, they are not heated but are considered comfortable. There is no classification made for the products of farmers as each of them has the privilege of offering whatever he has for sale. As to the tenants the classification is made in their leases. We have no system whereby produce can be shipped in by farmers to be sold for them and no provision is made for the instruction of growers in the preparation and exposure of their produce.

In 1913 a refrigerating plant was installed in the Bonsecour market for the use of butchers and provision traders.

SAINT-HYACINTHE, QUE.

A. MESSIER, CITY CLERK

Our city market is opened Tuesday and Thursday from 4 to 12 a.m. (Noon) and Saturday from 4 a.m. to 6 p.m. but the market is also opened from 6 p.m. to 9 p.m. on Friday evening from the first Friday of November till the last Friday of April following. During the hours above named the customer can buy.

Butchers and vegetable dealers have places inside the market and pay a rent in advance, the first of May and the first of November of each year. Three butchers use refrigerators cooled with ice at their expense. Four butchers have bought a

Linde refrigerating machine and the city has built the refrigerators. The other butchers use a public refrigerator situated about 300 feet from the market.

Outside the market there are butchers' stalls used by other butchers on the Saturday and the rent is less.

Outside the market there are two long roofs under which are placed farmers and their stock. The farmers, have their carriages placed all around the market in four ranks and sell vegetables, grains, apples, etc.

OTTAWA, ONT.

BY W. BORTHWICK, MARKET INSPECTOR

According to the city By-Law No. 3358 every day in the year shall be a market day except Sundays and statutory holidays, but we have found by experience that Tuesdays, Thursdays, and Saturdays are the principal market days throughout the year.

Our market place is so arranged that one portion containing sixty stands is allotted for the use of hucksters. These stands are reserved on the same conditions as those for farmers. No privileges are granted to hucksters but rather they are restricted by being prevented from buying farm produce before 8.30 in the morning.

There are three hundred and eight stands at present which are reserved for farmers and gardeners for which they pay from \$5 to \$25 each according to location. The

average price being about \$10. These stands, along with those reserved for hucksters, occupy about one-half the market place. Almost all of the farm produce is sold from wagons.

The only part of our market that is covered is the portion occupied by butchers and fish dealers, and the weigh scales and office. The market being an open one there are no selling arrangements whatever.

We have no definite method of classifying produce on the market because it is brought in by the farmers in mixed loads. This makes necessary the grouping of various classes of produce. No special provision has been made for instructing the growers but from time to time the officials make suggestions and recommendations that are heeded by the growers with the result that

there is a continual improvement in the appearance and quality of the goods being brought to the market.

According to the city By-Law the duties of the market inspector are general supervision and control over the market and public weigh scales, collecting market fees and rents, and enforcing the provisions of the By-Law. His duties are many and varied but he has the satisfaction of knowing that there has been a material increase in the attendance at the market, and that no one has been injured thereon requiring medical

attendance during the past ten years. In no year has any vehicle been injured to the extent of \$5 damages, and during the past ten years the receipts for market tolls have increased from \$8,074 72 in 1908 to \$11,155.68 in 1918. Improvements have been made throughout the market place but the principal one has been the paving of the market square and the streets leading to it. There is now on hand \$150,000 which, in the near future, will be spent on further improving the Ottawa city market.



A PART OF THE CITY MARKET, OTTAWA

TORONTO, ONT., ST. LAWRENCE MARKET

BY D. CHISHOLM, COMMISSIONER OF PROPERTY

Although the market is open every day the chief business is done on Saturday. No privileges are granted to hucksters, and grocers are not allowed to occupy our markets, although the spaces are rented to butchers who conduct business all week similar to store keepers.

In the south market stalls are rented while the north section is subdivided, a portion being used by farmers who sell vegetables or fruit, etc., from wagons and other vehicles. Another part is occupied by farmers who express their goods to the city, later coming in by train to handle their

commodities from tables supplied by the corporation.

Both the south and north markets are covered and the south is heated for the convenience of the butchers or others who pay a rental for sections.

We have no provision for the instruction of growers in the preparation and exposure of their products, because those producing and dealing at the Toronto market are well acquainted with the quality of commodities most suitable for the trade in Toronto. They learn by observation and business dealings what the buying public demands and are

very quick to employ such practices as will enable them to prepare and expose their products to the best advantage.

The market superintendent has charge of the market under my supervision, with a staff to attend to cleaning, sanitation, etc. He also allocates positions of stalls, collects rents, rents spaces, etc., in accordance with the requirements of city by-law No. 4327.

Some time ago the city of Toronto rented from the C.P.R. Co. an old passenger station in the northern section of the city and on our main thoroughfare. This market is provided absolutely free to farmers for the disposal of their produce to householders; however, even with this privilege, we have had difficulty in operating more than one day per week. The citizens apparently will

not attend except on Saturday; and further, owing to the scarcity of help throughout the country during the past few years, the farmer is unable to leave his farm or garden for more than one day in the week.

Notwithstanding all the facilities offered by the municipality the operation of the market does not seem to have reduced in any degree the price of goods. In this connection I have suggested to the Board of Commerce that a maximum price be set on such goods as may be specified by them and placed on sale in our markets by farmers or others who are not charged any taxes, license, or fee for the concession. This, to my mind, would seem fair in view of the fact that these persons compete with merchants who pay large amounts in general and business taxes.

LONDON, ONT.

BY H. A. BRAZIER, CITY ENGINEER

THE London city market is open from 7 a.m. to 6 p.m. every day in the week and until 10 p.m. on Saturday. There is one long shed containing thirty-two stalls, which are rented to monthly tenants, who are not permitted to sell articles for less than 25 cts. each. One long shed for market gardeners contains forty stalls which are all rented by the year and paid for in advance. The market house, which contains eighteen stalls on the main floor, occupied by butchers, grocers, etc., is rented by monthly tenants. The basement of the market house is for farmers who have eggs, butter, poultry, etc., to sell. This is provided with heat and light by the city and is granted free to farmers. There is accommodation for two hundred or

more with tables and benches, and space on the market is provided for six hundred wagons.

No selling privileges are granted to hucksters, and they are forbidden to buy on the market after 11 a.m. Grocers are permitted to buy on the market at any time. No arrangements are made for classification in the open spaces, nor is any instruction given to the growers in the preparation of their produce for market. There is no system whereby farmers can ship in their commodities to be sold on commission. The market clerk has full control of the market, placing of the wagons, etc., and maintains peace and order about the premises.

ST. THOMAS, ONT.

BY E. A. HORTON, MAYOR

THIS city has two public markets, which are both open in the forenoons of Wednesday and Saturday of each week. Covered stalls are provided for butchers, and stalls and spaces, both covered and otherwise, are at the disposal of those who have butter and eggs and other produce for sale. Covered stalls are sold or rented by the lessee of the market. The greater part of the selling is done from wagons. Large covered sheds are provided, but they are not heated. Products are not classified, and no instruction

is given to growers. Certain kinds of produce such as fruit and vegetables are shipped in and sold. This may be either on the market or from the car. These shipments are sometimes brought in by regular dealers and in other cases by outside dealers who are responsible for the receiving and selling of same. The lessee of the market has full charge. There is no difficulty about the amount of business done, as our markets are both well attended by both buyers and sellers.

PORT ARTHUR, ONT.

BY T. F. MILNE, CITY CLERK

The front portion of the Port Arthur city market is an enclosed permanent building, heated by steam from the steam plant in the police station close by. A part of the

yard at the rear is covered by an open shed and during the summer this shed is largely used by the farmers and the buying public. Selling is also done on the street adjoining

the market when the sheds are crowded on busy days. A portion of the market building is occupied by a butcher, who pays a monthly rental.

Both the citizens of Port Arthur and the farmers from the neighbouring districts have found the market a great convenience. Produce of the highest quality is always to be found here and the farmers take a pride in the appearance of their offerings. Wednesdays and Saturdays are market days, and business is done from 7 a.m. to 5 p.m. On other week days the market is open from 8 a.m. until 12 o'clock noon, when the manager is on duty to sell produce on a commission basis. Arrangements are made whereby the farmers are able to ship their vegetables, meats, dairy produce, honey, etc., to the market and have the same sold for a 5 per cent commission. This encourages

the farmers a distance of fifty or sixty miles away to patronize the market and thus enables the city folk to secure fresh vegetables, etc., every day in the week.

In the city by-laws provision is made whereby the market manager is permitted to weigh, count, or measure anything sold on the market or otherwise to ascertain if any fraudulent dealings are practised. Hucksters, grocers, butchers, etc., are not allowed to purchase for re-sale any article on the city market without the authority of the market manager, but producers are allowed to sell articles at the stores and shops at any time. Booths or other definite spaces on the market are assigned by the market manager, who possesses the powers of a special constable and is responsible for the enforcement of order in the market and environs.

FORT WILLIAM, ONT.

BY H. MURPHY, MAYOR

Our market days are Tuesdays and Fridays of each week when the market is open from 7 a.m. until nearly noon. Hucksters are allowed to sell from 7 to 10 in the morning. After ten in the morning merchants and others may purchase on the market. Butchers only may erect stalls and sell on market days. Applications have never been made by other merchants for selling privileges.

The market building is equipped with convenient long counters occupying nearly the full length of the building and the goods are displayed on these counters. Each huckster is allowed a space ten feet long for which he pays according to the position, those near the entrance of the market pay ten dollars a year while the cheapest allotment at the further end is six dollars. No other fee is chargeable for selling on the market except for transients carrying baskets who may sell in a space allotted at fifteen cents a day.

All goods are brought to the market in wagons or automobiles and backed into position convenient to the counter. Sufficient of the produce is placed on the table and the reserve is kept in the vehicle. No horses are

allowed in the immediate vicinity but comfortable sheds are provided for them at a suitable distance. Meat and fish stalls are located at a distance from the rest of the hucksters and do business in screened sections. The market building is fully covered and accommodations are provided for the use of those patronizing it.

At the beginning of the market season in May one of the instructors from the Industrial Farm outside the city gives talks to the farmers and indicates ways and means by which they may produce vegetables most suitable for market demands and in addition he makes occasional trips through the country giving necessary information regarding varieties and methods to be employed in getting the most satisfactory crops.

Our market clerk is authorized to accept cases of goods on consignment to be sold on a commission basis of five per cent. It is also his duty to open and close the market, keeping it in good order at all times and further on each market day he marks on a large blackboard the prevailing prices of the various articles handled on the market.

WINNIPEG, MAN.

BY R. KIDD, MARKET SUPERINTENDENT

At the present time we are without a market building, the one that we had for a number of years has been converted into offices for the various city departments. The produce this year was sold at the street curb mostly to peddlers who peddle it throughout the city.

There is an agitation among the producers here at the present time for the city to establish two or three markets throughout the city which may result next spring in the city establishing one or more markets.

REGINA, SASK.

BY MAYOR BLACK

Our market building was erected during 1910 at a cost of about \$18,000. It was erected on a portion of a block of land which was deeded to the city by the Government. It is a first class building having cement flooring, steam heating and mennominie sand mould brick construction. The whole of the plot which is 500 x 270 feet is used for marketing purposes. Weigh scales are installed on the ground for the weighing of coal, fire wood, hay, straw, etc. The market is situated in an excellent locality being only four blocks from the post office on the same avenue and on a street car line.

For some time after its construction the city council endeavoured to educate the producers of garden truck, poultry, dairy produce, etc., and the general public to patronize the market, but unfortunately no very great interest was taken by either side. As a result in 1913 it was decided to use the building as a storehouse for certain civic

departments. Early in 1914, however, the Local Council of Women interested themselves in the market question and with the support of the city council the building was placed in condition and reopened on September 12, 1914.

The main idea of the Civic Economics Committee of the Local Council of Women was to provide an open market for the sale and purchase of all kinds of supplies at first cost. They set out with the object of building up an extensive and successful market for the produce grown in this part of the province and to endeavour to establish the city market as a permanent going concern. Generally speaking the market has been very well patronized and it may be said that under the control of the Local Council of Women it has contributed in no small degree to the welfare of the residents of Regina as well as of the immediate districts surrounding the city.

SASKATOON, SASK.

BY M. M. MORRISON, MARKET MASTER

The public market in the city of Saskatoon is open every regular working day from 8 a.m. to 6 p.m. and Saturday evening until 10 p.m. Hucksters are granted the privilege of selling on the open market after 10 a.m., but are required to pay a fee of 25 cents. Merchants are permitted to buy on the open market after 10 o'clock and through the market master at any hour, but in order to sell on the market they must pay a fee of 25 cts.

No extra provision is made for the convenience of sellers and buyers, as it is very seldom required. Ample space is provided for those who require it under a veranda along the side of the market building. The stalls within the building are rented by the month to anyone applying when there is a vacancy. Outside the building on the market square space is sold or rented each day as required, none being reserved.

Very little selling is done from wagons, as vendors find ready sale for their produce throughout the city and are content with the

price. They feel their time to be worth more than they would gain by selling their own produce from house to house. Other farmers leave the selling of their commodities to the market master, who charges a 5 per cent commission for his work.

The market square and the auction sale rooms are both open spaces, but the market building is roofed and heated. The only instruction given to growers is verbal advice to those who may bring in goods which are not in prime condition.

In the market master's stall goods are sold both wholesale and retail. He charges an advance of 2 cents per pound over the wholesale rate on all goods retailed. The farmers simply forward their produce to him for sale, he deducts a five per cent commission and remits the balance to them. This practice appears to be working well, and it has a tendency to keep down the price and incidentally helps to solve the high cost of living.

CALGARY, ALTA.

BY D. G. MCKENZIE, MARKET SUPERINTENDENT

Tuesday and Saturday are known as farmers' market days here, although the market is a daily one and is open from 8 a.m. to 6 p.m., with the exception of Wednesday a half holiday, and Saturday, when it is open from 7 a.m. to 9 p.m.

Hucksters are allowed 7 ft. by 8 ft. stands on the market at \$1.50 per day; butchers and grocers occupy space daily at the market

at a monthly rental. Space is charged for according to location at a fee of 9 to 12½ cents per square foot per month. Special spaces are reserved for farmers and no selling is done from the wagons, with the exception of hay, seed, and green feed.

Our market is a brick building with cement floor, heated by steam, and containing all conveniences for the comfort of both buyers

and sellers. Arrangements are made for putting produce into its special classes; poultry, meat, butter and eggs are separate from the vegetables, etc. The only provision made by the department for instructing producers in the exposure of their produce is that butchers are compelled to protect their meat behind glass.

We have a department in connection with our municipally owned market where the farmer or producer living at a distance can consign his products direct to the market superintendent and have same sold in the open market. This produce is offered to the citizens at retail prices until the hour of 12 o'clock noon, after that the surplus is sold to the best advantage. A commission of 10 per cent is charged.

The market includes the produce department, weigh scales, and city pounds. The business in the produce department has been increased slightly and every reasonable effort is being made to encourage the farmer to ship in his produce. This department is being regularly advertised in the local and farm

papers and it is our ambition to get returns back promptly.

We are handicapped as to location for retail business, Saturday being the only day that citizens patronize us extensively. We have also serious opposition. At one time there were no less than six privately owned and operated markets in Calgary. At the present time there is only one private market being operated, while another, centrally located, is being started. These markets, in my opinion, injure our business, owing to the fact that they draw trade from the farmers of our municipal market, discouraging them from attending same. Thus our situation is a difficult one.

Before the private markets started operating we were doing a good business, and in 1914 found it necessary to build an extension to the market. However, with the outbreak of the war and the opposition of other markets our market was hard hit and although we have been showing a favourable increase during the past year, the amount of business being done is not satisfactory.

VANCOUVER, B.C.

BY CHARLES REID, SECRETARY TO THE MAYOR

We have not in Vancouver a market in the generally accepted meaning of that term. We have a city market which was erected for the purpose of providing space to farmers and hucksters, and was so conducted by the city with more or less success for a number of years. The distance of Vancouver from a large market garden area, however, made it difficult to induce farmers to drive in with their produce as it was thought at one time would be done.

About eighteen months ago, the building, a large and well made structure, was renovated and rented to the Defiance Markets, Limited, who installed an up to date fish stall in a portion of the premises, and sublet the balance for a meat market, poultry market and grocerteria, all four of the above lines being conducted there at the present time.

The business of the market building is conducted all day long every day the same as obtains at the city stores.

Hucksters and market gardeners pay a nominal fee to the lessee of the building for the use of an open platform which in size is approximately 25 feet by 150 feet. It occupies the space in front of the building. A small amount of selling is done here also from wagons and automobiles.

The market building which is large and well lighted is divided into various large shops where buying and selling is conducted.

Provision is made for handling the produce of growers who are not able to go to the market. This produce is handled on a commission basis by the lessee, who conducts the grocerteria.

VICTORIA, B.C.

BY A. G. ROBERTSON, MARKET SUPERINTENDENT

On Tuesday and Saturday of each week this market is open from 7 a.m. to 6 p.m. The selling is direct from purchaser to consumer, no hucksters nor merchants being granted selling privileges here. No selling is done from wagons but stalls, side by side, separated from each other with plenty of space for buyers, are reserved and allotted to the sellers. As far as possible the various kinds of produce are classified and kept separate, e.g., the butter, dairy produce, or vegetable stalls are kept together as much as possible according to their kind. The

market building is all covered in but is not heated.

No provision is made for the instruction of growers in the preparation of their produce, the city simply rents the stalls to the various holders. We have no system in connection with the market by which producers can ship their produce to be sold for them. The duties of the person in charge of the market are to collect all stall rents, the renting of vacant stalls, and maintaining the good appearance of the market building.

ASSOCIATIONS AND SOCIETIES

EVENTS OF THE MONTH

Dec. 2-3-4—Fourth annual Saskatchewan winter fair to be held at Saskatoon under the auspices of the Saskatchewan Live Stock Board and the Dominion Department of Agriculture. Manager, C. D. Fisher, Room 58, York Building, Saskatoon.

Dec. 4-5—Sheep and Swine Sale under the direction of the Sheep and Swine Breeders' Associations to be held at Saskatoon. Secretary, J. G. Robertson, Live Stock Commissioner, Department of Agriculture, Regina, Sask.

Dec. 5-11—Ontario Provincial Winter Fair, Guelph. Secretary, R. W. Wade, B.S.A. Parliament Buildings, Toronto.

Dec. 9-12—Alberta Winter Fair, Calgary, Alta. Secretary, E. L. Richardson, Calgary, Alta.

Dec. 11-12—Toronto Fat Stock Show at the Union Stock Yards, Toronto. Secretary, C. F. Topping, Union Stock Yards, Toronto, Ont.

Dec. 11, 12,—Meeting of the Canadian Phytopathological Society at the Ontario Agricultural College, Guelph; Secretary, R. E. Stone, Guelph, Ont.

FRANCE REQUIRES BREEDING POULTRY

The Directors of the National Avicultural Society of France have been granted a substantial credit by the French Government for the purpose of acquiring breeding poultry for the restocking of the liberated regions in France. This need was brought to the attention of the Federal Minister of Agriculture by Monsieur M. Chevalier of the Credit Foncier Franco-Canadien, the Minister referring Monsieur Chevalier to the National Poultry Council.

The Council is now in communication with the Avicultural Society of France and pending receipt of information as to the quantity of the different breeds required, the Provincial Representatives of the Council are making a survey of their respective provinces in order to ascertain what stock may be available for export. The varieties favoured by the French are the Barred Plymouth Rock, the White Wyandotte, Black Minorca and Rhode Island Red, and also Bronze Turkeys. An appeal is being made by the President of the Council to the Provincial Departments of Agriculture, Agricultural Colleges, and the Canadian Press, to do all possible to assist in the acquiring of the necessary information to carry on negotiations with the Avicultural Society of France, and to take advantage of the opportunity presented to place Canada in a favourable international light as a producer and exporter of breeding poultry.

It is interesting to note that in a report issued by the Commissioner General for Canada in France importations of eggs into that country in 1912 amounted to 303,243

(Quintaux metriques), the exports for the same year being 51,155. In 1918 the imports fell to 71,612 and the exports 4,600. From these figures it will be seen that prior to the war France was a heavy importer of eggs, and no doubt efforts will be made to bring the poultry population of France above the pre-war level in order that she may be self-sustaining. Canada should be in a position to supply all the breeding poultry required, but it will be necessary for all interested to give all assistance possible to the National Poultry Council in the locating and the selecting of bred-to-lay stock. The Officers of the National Poultry Council are as follows:—

P.E.I.—Dr. P. C. Gauthier, Vice-Pres. National Council, St. Louis.

N.S.—Mr. H. H. Hull, Poultry and P.S. Ass'n, Glace Bay.

N.B.—Mr. A. C. McCulloch, Poultry Division, Dept. of Agriculture, Fredericton, Que.—Dr. S. Lafortune, Pointe Gatineau.

Man.—Mr. N. W. Kerr, Vice-Pres. National Poultry Council, Brandon.

Sask.—Mr. H. M. Arnaud, Sask. Provincial Poultry Association, Regina.

Alta.—Mr. C. M. Baker, Alberta Provincial Poultry Association, Calgary.

B.C.—Mr. H. E. Waby, B.C. Provincial Poultry Association, Enderby.

Ontario Representative and President of the Council—Dr. Robt. Barnes, Health of Animals Branch, Ottawa.

Secretary Treasurer.—Ernest Rhoades, Live Stock Branch, Ottawa.

NATIONAL DAIRY COUNCIL

Every province of the Dominion with the exception of Manitoba, was represented by one or more delegates at the meeting of the National Dairy Council held in Ottawa on October 14th. A number of important questions concerning the dairy industry of Canada were discussed and several resolu-

tions were passed including one on feed standards, recommending that the present standards be revised and that the supervision of same be given over to the Dominion Department of Agriculture for such revision and subsequent enforcement. Also resolutions were passed on the excessive cost of dairy

equipment and cattle feed, and on the reduction of customs duties.

The platform of the National Dairy Council of Canada aims to protect and promote the dairy industry of Canada and by its organized force and co-operation with the Dominion Department of Agriculture and the provincial government proposes to accomplish its task. The platform, as stated at the convention, is as follows:—

PLATFORM OF THE NATIONAL DAIRY COUNCIL

1. Greater consumption of dairy products.
2. Better marketing conditions.
3. Increased production of milk and its products in Canada.

Greater consumption of dairy products will be brought about by judicious advertising. The National Dairy Council will strive forcibly to bring home to every mother and housekeeper in Canada, the knowledge that milk and its products in substantial quantities are indispensable in the diet of healthy people, both children and adults, and are, from an economic point of view, by far the cheapest of all foods of nutritious value. There is no substitute for dairy products, and a vigorous healthy nation, cannot exist without the extensive use of them.

Better marketing conditions for milk and its products, for which the National Dairy Council is prepared to fight, include the maintenance of fair prices, prompt and careful transportation at reasonable rates, suitable terminal facilities for shipping, receiving and keeping, and reasonable and judicious government regulations for the handling and sale of dairy products.

Increased production of milk and its products must follow if greater consumption is brought about. The best and most economical method of increasing production of milk is by improvement of the producing herds by the elimination of the scrub bull, the use of pure bred sires of good milking strain, the testing of milking cattle, and the elimination of all poor producing animals from the herd. The National Dairy Council will assist good breeding, weeding and feeding of dairy cattle.

The dairy industry is one of the greatest industries in Canada and in it there are over 500,000 persons engaged, and its products are valued at over \$200,000,000 annually. In order to overcome a number of influences, which have seriously affected and even threatened the welfare of this industry, the following recommendations have been made with a view to protecting and promoting the industry in every legitimate way.

RECOMMENDATIONS

1. That steps be taken to arrange for the holding of an annual National Dairy Show, under the auspices of the National Dairy Council at such points and on such dates as the executive of the National Dairy Council may deem best, and that the full co-operation

of all interested in dairy organizations be invited.

2. That the dairy interests shall be so organized that, whenever matters of provincial or national importance are receiving the attention of the Governments, it shall be possible to advise members of the provincial legislatures concerned, or of the Dominion House of Commons, with the least possible delay, how their constituents believe the dairy industry will be affected thereby, and what, in their opinion, and the opinion of the National Dairy Council, is the policy that should be pursued.

3. That copies be obtained of the requirements of various municipalities, condensaries, milk powder plants, etc. throughout Canada, as well as in the United States covering the conditions under which milk must be produced, its butter fat content, etc., and that from these model regulation be drafted with the purpose of supplying these, and information bearing on them, to milk producers' organizations, municipal bodies, and other groups of individuals interested, as the need for them may arise.

4. That with the object of standardizing as far as practicable, the price of milk throughout Canada, information be gathered monthly throughout the Dominion, as well as in the United States, either through the National Dairy Council, or the Dominion Dairy Division, concerning the prices being paid for milk for city consumption, by milk condensaries, powdered milk factories, cheese factories and creameries, and that this information be supplied to all affiliated organizations interested therein and desiring the same.

5. That steps be taken to induce the various provincial governments and experimental farms to conduct farm surveys, showing the cost of producing milk under ordinary farm conditions, in all the provinces, as well as the cost of producing it on the experimental farms themselves, and that this information be compiled and kept available for instant use when required by public bodies and others interested in ascertaining the cost of producing milk. Similar information shall also be obtained from United States sources.

6. That complete information shall be obtained and kept on file concerning the best methods of encouraging a greater consumption of milk and its products, through campaigns conducted by women's organizations, municipal bodies interested in the promotion of public health, and the provincial and national dairy divisions, together with statements showing the cost and best methods of conducting these campaigns, sample letters, posters, and advertisements and such other information as may be necessary to facilitate the conduct of such campaigns throughout Canada.

7. That a study be made of the work being conducted by the Dominion and various Provincial Dairy Divisions, the United

States Dairy Division and of those States where the most progressive dairy legislation has been enacted, with the object of improving and extending, through the giving of suggestions and the co-operation, when desired, of the National Dairy Council, the work being done by the various dairy divisions and dairymen's organizations in Canada.

8. That a record be maintained of the various firms in Canada dealing in cheese, butter, and other dairy products, and that producers be encouraged to report monthly confidentially, to the National Dairy Council particulars as to the promptness with which

these firms settle their accounts, in order that unreliable and dishonest firms may be detected and exposed and the prompt payment of accounts assured.

9. That efforts be made to induce manufacturers of butter to buy cream on a basis of quality.

10. That the National Dairy Council shall endeavour to have carried into effect with the least possible delay, the recommendations relating to the promotion of the Dairy Industry adopted at the Dominion Dairy Conference held in Ottawa in November, 1918.

THE FEDERATED WOMEN'S INSTITUTES OF CANADA

The first federal convention of women's institutes held in Toronto in November dealt with affairs not only Dominion-wide, but as they related to women's institute activities in Great Britain as well. This federation of women's institutes is the result of a feeling, which has obtained throughout Canada for some time, that a closer co-ordination of work being done by these organizations in the various provinces would be both desirable and beneficial in the unification of the work and the unification of the people. At the different provincial conventions the idea of such a federation was endorsed and steps were taken for its inauguration. A conference was held in Winnipeg early this year resulting in the formation of a Federated Women's Institute of Canada.

The federation includes the women's institutes of Canada, the homemakers' clubs of Saskatchewan, the home economic societies of Manitoba, and the homemakers' clubs and cercles des fermières of Quebec

The motto of this organization is "For Home and Country."

The administrative body of the federation consists of a board of directors, including a president, corresponding secretary, two members from each province, the superintendent of provincial women's institutes, and conveners of all standing committees. The executive of the federation consists of a president, a first vice-president, a second vice-president, a treasurer, a corresponding secretary, and three other members along with one additional member for each province which later joins the federation.

Superintendents of provincial women's institutes shall be ex-officio members of the executive, and the presidency shall alternate between eastern and western Canada. A federal convention will be held every two years and this also shall alternate between eastern and western Canada.

The President of the Federated Women's Institute of Canada is Mrs. Arthur Murphy, Edmonton, Alta., and the corresponding secretary is Mrs. J. H. Price, Calgary.

ONTARIO WOMEN'S INSTITUTES

The annual conventions of the women's institutes of Ontario were held at three points in the province, Ottawa, London and Toronto. The Ottawa meeting was held on October 22 and 23, the London meeting on October 28 and 29 and the Toronto meeting on November 12, 13, and 14. For the purposes of these conventions the province is divided geographically, the central section taking in fully half the province. All of the meetings were marked by unusual enthusiasm. The tremendous amount of work accomplished during the period of the war developed a true spirit of self sacrifice and impressed the women with their power for service. The reports of individual institutes indicated a wide field of activities covering practically all services calculated to improve rural conditions. Special emphasis was placed upon rural health problems, the improvement of the rural school, the advancement of the

rural community centre movement and the welfare of the children.

A feature of each convention was a discussion on the hot lunch in the public school. Following an address on this subject at each meeting by Mr. A. H. Leake, Director of Household Science and Manual Training for Ontario, the delegates were served with a typical school lunch which was ample for the noon repast. The lunch consisted of two meat and two jam sandwiches, fresh fruit and cocoa. There was exhibited on each occasion the hot lunch outfit recommended for the one-roomed school.

At each meeting Mrs. Watt and Mrs. Hobbs, who had organized women's institutes in England described the work accomplished through these organizations and outlined the system of women's institute schools. They displayed an exhibit of samples of the handicraft of women of

England consisting largely of hand made toys.

Mr. G. H. Putnam, Superintendent of Institutes, directed the course of each convention. In his annual report he recommended the appointment of specialists (a) to advise and help with the health work—medical school inspection, clinics and physical development; (b) to deal with food questions—cooking, planning meals, nutrition and food prices; (c) to deal with housing

problems—house building, remodelling and labour saving devices; (d) to help with the development of girls work; (e) to assist in business methods—programme of work, etc.; (f) to direct community undertakings—children shelters, community halls, rest rooms and social centres.

The attendance at the conventions was at Ottawa, 300, at London 325 and at Toronto 600.

INTERPROVINCIAL PLOUGHING MATCH, OTTAWA

The Eastern Ontario and Western Quebec Ploughmen's Association held their first interprovincial ploughing match at Ottawa in October. This competition was the result of the efforts put forward by a number of prominent agriculturists in eastern Ontario and western Quebec, who on March 18th of this year organized a new association. The eastern counties of Ontario had never, until this year, enjoyed the advantages of a large ploughing match and tractor demonstration. Conditions in these counties are such that farm operations are of a somewhat different character from those in southwestern Ontario, dairying being one of the most important industries in eastern Ontario.

Fields on the Central Experimental Farm and on the Booth farm adjoining it were chosen for the use of the ploughmen and tractor demonstrators during the days of the match. The weather conditions throughout were favourable and the attendance of visitors, both urban and rural, numbered many thousands. The executive of the organization and those who favoured the holding of the tractor demonstration and ploughing match were well pleased with the results.

The quality of the ploughing, considering the character of the fields, part of which were badly infested with twitch grass, was up to the standard. In spite of the difficulties encountered through lack of uniform conditions in the sod land the competitors showed great skill in the manipulation of their implements and the control of their teams.

The great feature of the match, however, was the tractor demonstration, in which about forty machines participated. This demonstration was directed in the field by Professor W. H. Day, formerly professor of physics at the Ontario Agricultural College. To both city and country people these big machines, turning the ground over at an almost incredible rate, were the centre of a keen and lively interest. The tractors were manned by expert drivers and mechanics, who were glad to give instruction and information to all farmers who showed interest in them.

The secretary of the Interprovincial Ploughing Association is F. C. Nunnick, B.S.A., Ottawa.

ONTARIO PLOUGHING MATCH

The Ontario Ploughmen's Association held their annual ploughing match this year in Kent County, near Chatham. The event was under the direction of J. Lockie Wilson, Managing Director, who was ably assisted by other officials of the association. The classes were well filled and competition was keen. The winner in the sod class of the opening event was Mr. A. E. Pay of Niagara-on-the-Lake, who was also winner of the sweepstakes prize at the Ottawa match two weeks before.

It was noticeable that the land chosen for the tractor demonstration at this match did not lend itself particularly to the artistic abilities of the demonstrators. It was some-

what rolling, in fact almost rough, and gave the demonstrators an opportunity to show what can be done with the modern tractor. Several hundred acres were turned over by the tractors during the demonstration and subsequent tractor ploughing contests in which farmers themselves guided the machines. The spectators were keenly interested and busied themselves in comparing and contrasting the work being done by the various types of tractors. These machines were judged by their performances and almost without exception their work passed the critical judgment of farmers.

ONTARIO BEEKEEPERS' ASSOCIATION

The thirty-ninth convention of the Ontario Beekeepers' Association was held at the Carls Rite Hotel, Toronto, on November 11, 12, and 13. The committee of resolu-

tions strongly supported the suggested establishment of a queen rearing apiary for the supplying of queens to aid in the control of the European foul brood, and to

improve the bees throughout the province. A resolution to this effect was adopted and a recommendation made that this movement be vigorously prosecuted. The bee-keeping industry in Ontario has as great a menace in the scrub queen as has the stock-raising industry in the scrub sire.

Owing to the seriousness of the foul brood diseases in Ontario and the great loss to the country caused by these diseases it was decided that a committee, appointed by the President, should interview the provincial

government with a view to securing a grant of \$30,000 to be used in stamping out foul brood in Ontario.

The officers for the coming year are: President, W. W. Webster, Little Britain Ont.; 1st vice-president, A. MacTavish, Carleton Place; 2nd vice-president, R. E. L. Harkness, Iroquois; secretary treasurer, Professor F. Eric Millen, Guelph. In addition there is a board of twelve directors and three fall fair representatives.

THE ONTARIO FRUIT GROWERS ASSOCIATION

The annual meeting of the Ontario Fruit Growers' Association was held in Toronto on November 5, 6 and 7. A well diversified educational programme covering the culture and handling of the more important fruits was carried out. Mr. W. F. Kidd, in charge of the Ontario Government demonstration orchards, reported that the department operates five leased orchards consisting of 1,350 trees in the counties of Lampton, Norfolk, Simcoe, Ontario and Prince Edward. In these orchards the cultivation, pruning, spraying and the use of cover crops is demonstrated. Cultivation was shown to have advantages over sod orchards. Dense windbreaks were shown to be favourable to the development of scab. The Lampton county orchard that had not been pruned or sprayed for twelve years before it was taken over is now clearing about \$500 a year profit. For old cankered trees severe topping had renewed the wood and made the orchard productive.

New varieties of small fruits originated at the Experimental Farm at Ottawa were brought to the attention of the convention by Mr. M. B. Davis, Assistant in Pomology. These included the Portia strawberry, the

Newman No. 23, Brighton and Count varieties of the raspberry, the Lincoln, Mary and Wilkins seedling varieties of grapes and the Kerry black currant.

Resolutions were passed covering the following points: Asking the provincial and Dominion governments to take such steps as will retain in Canada the services of the most competent officials who are leaving the country for more lucrative positions; asking the directors of the Ontario Fruit Growers' Association to investigate the feasibility of holding a national apple show in Canada; asking the Dominion Government to call together the fruit growers of Canada in conference; wishing that the women's division of the Ontario Government Employment Bureau be continued in order to assist in meeting the labour difficulty; concurring in a resolution prepared by the special committee of the Florist's Association that a National Council of Horticulture is desirable in Canada, the association agreeing to appoint representatives to such a council. The secretary of the association is Mr. P. W. Hodgetts, B.S.A., Department of Agriculture, Toronto.

MANITOBA SHEEP AND SWINE SALE

BY W. I. SMALE, SECRETARY, MANITOBA LIVE STOCK ASSOCIATIONS

The Manitoba Sheep and Swine Breeders' Associations, held a sale of sheep and swine at Brandon on October 22 and 23. There were sold by auction 724 sheep comprising 73 pure-breds and 651 grades. The grade sheep averages \$13.11. The following table shows the prices received for the animals of the different classes.

42 Oxford Down Rams,		
at.....	\$48 30	\$2,280 00
2 Leicester Rams at....	52 50	105 00
7 Shropshire Rams at...	62 86	440 00
6 Oxford Down Ewes at	28 33	170 00
7 Shropshire Ewes at...	20 00	140 00
9 Goats at.....	7 39	66 50
651 Grades at.....	13 11	8,531 50
724		\$11,733 00

In addition to those sold by auction a large number were disposed of by private sale. The grade spring lambs sold from prices ranging from \$11 to \$17. Grade ewes brought from \$10 to \$25 each.

In swine 14 pure-breds were sold by auction, and an equal number by private sale. The prices obtained for pure-breds were as follows:

5 Berkshire boars at	\$48 30	\$241 50
1 Yorkshire boar at....	35 00	35 00
1 Hampshire boar at	45 00	45 00
3 Berkshire sows at.....	71 83	215 50
2 Duroc Jersey sows at....	37 50	75 00
2 Yorkshire sows at.....	56 25	112 50
		\$ 724 50

BRITISH COLUMBIA VETERINARY ASSOCIATION

At the annual meeting of the British Columbia Veterinary Association held in Victoria, B.C., September 25th, the special subject discussed was that of provincial meat inspection. The association considers it probable that a bill providing for provincial meat inspection will be introduced at the next meeting of the legislature.

A complaint was received from one of the members of the association regarding the sale of biological products direct to farmers and stock men. This practice is considered detrimental to both the veterinary profession and live stock interests as the laymen are not trained to use such products successfully. The subject of the indiscriminate supplying of tuberculin direct to farmers, and the use of tuberculin by private practitioners, was also discussed. It was pointed out that the test

of animals by the provincial inspectors a few days after they had been injected with tuberculin by the owner, who concealed the fact, failed to give satisfactory results and rendered useless the official tuberculin test. It was agreed that when a private practitioner made a test he should immediately fill out a report to the government. In the matter of supplying tuberculin to farmers it was suggested that the association take up the matter intelligently with the federal government and come to such agreement as will be satisfactory to the Veterinary Association and the live stock interests.

The officers elected for the coming year are—President, A. J. Damman, D.V.S.; vice-president, Dr. Keown; secretary-treasurer, Dr. Kenneth Chester, New Westminster, B.C.

NEW PUBLICATIONS

FEDERAL DEPARTMENT AGRICULTURAL

Circular No. 12 Directions for Collecting and Preserving Insects, by J. H. McDunnough, published by the Entomological Branch of the Department of Agriculture, gives practical instructions in the collecting, mounting, and preserving of insects.

The Report of the First Canadian National Poultry Conference gives detailed information regarding the conference held at Ottawa, February 18th and 19th, together with the addresses of the various speakers and the resolutions adopted thereat.

Summary of Three Years' Experiments on the Tobacco Station at Harrow, Ont., Bulletin 41, *Second Series Experimental Farms*, by D. D. Digges, Superintendent, gives the results of accurate investigations, including tests of types of seed bed, manipulation of seedlings, preparation of soil, control of insects and diseases, along with information covering many other phases of tobacco growing in Ontario.

PROVINCIAL DEPARTMENTS OF AGRICULTURE

QUEBEC

Preparing Poultry for Market is a new pamphlet issued by M. A. Jull, B.S.A., Poultry Department, Macdonald College, Que. This pamphlet gives full information regarding rations and care for the finishing of poultry for market, along with the instructions regarding killing and dressing.

The Eleventh Annual Report 1918-19 of the Quebec Society for the Protection of Plants from Insects and Fungus Diseases, which is a supplement to the report of the Department of Agriculture, is issued by Department of Agriculture for the province of Quebec. It

contains the proceedings of the winter meeting of the Society held at Macdonald College, Ste. Anne de Bellevue, along with the papers read and reports of the officers of the Society.

ONTARIO

The Nineteenth Annual Report of Agricultural Societies of Ontario includes the report of Agricultural Societies and of the Conventions of Societies of Fairs and Exhibitions for the year 1919, and gives the following statement of receipts and expenditures of Agricultural Societies as well as considerable information on live stock, poultry, grain, and other exhibits at the fairs in the province.

Women's Institute Leaflet, Circular No. 24, contains the announcement of the annual provincial women's institutes conventions, and conventions of the federal women's institutes of Canada, together with the complete programme to be followed by each.

Report of the Stallion Enrolment Board 1919 gives the number of stallions enrolled for 1919, in Ontario, and states the number of interim certificates issued. It also gives a table of breeds which shows that approximately eighty per cent of the horses enrolled belong to the heavy draft breeds.

The Forty-ninth Annual Report of the Entomological Society of Ontario 1918 contains the minutes of the annual meeting at Guelph, together with reports from the council, librarian, the curator, and various branches of the society, and includes a number of valuable papers on entomological subjects.

SASKATCHEWAN

The Fifth Annual Report of the Co-operative Organization Branch, 1918, includes a summary of the work carried on by the Saskat-

chewan Co-operative Creamery Ltd., the Saskatchewan Co-operative Elevator Company, Ltd., the Municipal Hail Insurance Association, the Wholesale Trading Department of Saskatchewan Grain Growers' Association Ltd., during 1918, and an outline of the development of the new Co-operative Stock Yard Companies, along with the regular report of the work of the Co-operative Organization Branch.

BRITISH COLUMBIA

Bulletin No. 1, Hand Book of British Columbia, 1919, gives the history, topography, climate, resources, and development of the province of British Columbia, and makes special mention of the agricultural progress and possibilities of the province.

Seed Growing.—Some Consideration by P. A. Boving of the Department of Agronomy, University of British Columbia, explains the necessity for Canadian growers to produce their own seeds, and presents information of use to the grower.

Agriculture of British Columbia, Bulletin No. 8, contains a descriptive review of the province, profusely illustrated, and outlines its agricultural developments. It also contains considerable information of value to prospective settlers.

Nature Study and Primary Geography, issued by the Department of Education of British Columbia, deals with nature study and elementary agriculture as they are related to the study of geography.

MISCELLANEOUS

The following books have been compiled and edited in the office of the Canadian National Live Stock Records, Ottawa:—

Clydesdale Stud Book of Canada, 1919, Vol. 35, includes registration numbers of stallions from 19879 to 21004, and of mares from 40230 to 42575. This book also contains the constitution and rules of entry, the minutes of the thirty-second annual meeting, the members of the association, and list of awards at recent exhibitions. The secretary of the Clydesdale Horse Association is J. W. Wheaton, Toronto, Ont.

The Canadian Ayrshire Book, Vol. 28, 1918, containing the pedigrees of all Ayrshire cattle recorded in the Dominion from January 1st to December 31st, 1918, includes the names of animals from 57510 to 61995. The secretary is W. F. Stephen, Huntingdon, Que.

The Canadian Hereford Herd Book, Vol. 10, 1919, includes the pedigrees from 28801 to 33604 and contains the minutes of the twenty-eighth annual meeting of the association which was held in the Carls-Rite Hotel,

Toronto, February 6th, 1919. Secretary of the Canadian Hereford Association is H. D. Smith, R. R. No. 1, Ancaster, Ont.

Vol. 35 of the Dominion Shorthorn Herd Book gives the pedigrees of Shorthorn cattle imported, Canadian, and American bred, which were recorded January 1st to December 31st, 1918. The registered numbers of bulls run from 117695 to 126249 and the numbers of the females run from 113566 to 143359. The volume gives information regarding names and addresses of breeders and owners, rules of entry, fees for registration, index to animals and also the minutes of the thirty-third annual meeting held in Toronto, February 3rd, 1919. The secretary of the association is George E. Day, B.S.A., Gu'lp'h.

Vol. 21 of the Canadian Kennel Club Stud Book for 1919 contains registration numbers from 17874 to 19452, along with the constitution and by-laws, rules for entry, registration fees, etc. The secretary of the association is Juan E. Dowling, Toronto, Ont.

Canadian Holstein-Friesian Year Book published by the Holstien-Friesian Association of Canada contains a list of official and semi-official butter and milk records which have been admitted to the record of merit and record of performance together with a list of all record cows under their sires and under their dams with the proven sons of such sires and dams and also the highest record cows in each division.

The Study and Improvement of Plants and Seeds, prepared by the Canadian Seed Growers' Association and printed by the Dominion Seed Branch, is a circular for the guidance of boys and girls in the study and improvement of seeds and plants. It is in three parts. The first deals with the seed, the second with cultural systems, and the third is of special interest to teachers who are engaged in teaching agriculture.

The Canadian Annual Review 1918 completes its treatment of the world-war and its association with Canadian history and with the national and imperial developments of the past five years. It also contains a full record of 'Canadian agriculture and the war in 1918.'

Farm Management, by J. H. Arnold, United States Department of Agriculture, is a two hundred and fifty page book dealing with one of the most important phases of agricultural study. It discusses in clear and non-technical fashion such subjects as types of farms, advantages gained by situation, farm organization, business methods, etc.

The Province of Saskatchewan issued by the Department of Interior of Canada outlines the development and opportunities with special reference to the agricultural possibilities in the province of Saskatchewan

NOTES

For the information of co-operative organizations that market live stock in the province of Saskatchewan, the Department of Agriculture of that Province has issued a schedule showing the stock loading days on the railways of the province.

Saskatchewan again has won the world's prize and sweepstakes for the best spring wheat at the International Soil Products Exposition at Kansas City, Mo. In the past seven years Saskatchewan has won this trophy every year but one.

A new tractor laboratory, 145' by 75', has been added to the engineering building of the college of agriculture at the University of Saskatchewan. It will provide ample room for the operation and testing of a large number of tractors under comfortable conditions during the winter.

According to an official statement issued by Van Evrie Kilpatrick, Supervisor of School Gardens, of the Board of Education in New York City, 62,973 pupils, representing 244 schools within the city of New York, produced in their war gardens in 1919 crops having an estimated value of \$754,895.

In order to equalize the expenses of delegates attending the Secretaries' Conventions held at Calgary on November 4th and 5th, and at Edmonton on November 11th and 12th, the United Farmers of Alberta pooled the railroad expenses. The pool rate was \$5 per delegate.

Very keen interest has been taken in judging competitions at the school fairs in Weyburn district under Inspector A. Kennedy, M.A. At the Goodwater school fair the \$100 scholarship given by the college of agriculture was won by James Dalgleish who competed against twelve boys and girls.

Through the representations of the Honourable C. A. Dunning the customs duty on milking machines for Saskatchewan has been lowered from 27½ per cent to 20 per cent. This means much to the dairy industry of the province as many of the large dairies consider the milking machine indispensable.

A series of lectures on home nursing and the care of children, which have been given in various parts of Saskatchewan, have been very successful. Keen interest has been shown at each place visited, and the courses, which usually extended over two or three days, were attended, on an average, by about fifty-five mothers.

At the International Soil Products Exposition in Kansas City, Mo., entries from Manitoba won thirty-five 1st, twenty-five 2nd, and twenty-two 3rd prizes as well as seven trophies. The trophies include the world championship for a collection of

vegetables, the world championship for smaller grains, and the world championship for the most attractive exhibits.

There are in the province of Manitoba 220 central boys' and girls' clubs with 1,200 branch clubs, with a membership of 26,500. These members carried on ten projects or contests during the year, including sewing, cookery, vegetable growing, poultry raising, canning, live stock work, corn growing, dairying, weed eradication, and record keeping.

The Superintendent of Women's Institutes of Alberta has sent a questionnaire to all the branch institutes of that province asking for outlines regarding the work all the branches are doing in conjunction with school activities. The women's institutes throughout the Dominion are taking an active part in the improvement of school conditions especially in the rural districts.

The Dominion Department of Agriculture, through the Experimental Station at Scott Sask., is making a test of the value of sunflower ensilage in cattle feeding. In filling the silos green oats were mixed with the sunflowers. This ensilage will be compared with ensilage from other crops in the feeding test. A carload of steers purchased on the Edmonton market is being used in this experiment.

The Manitoba Agricultural College has secured an additional dairy herd of twenty Holstein cows and heifers, seven of them pure bred and the other thirteen high class grades. These animals were part of three carloads purchased in eastern Canada for the Manitoba government by George Simms, who is doing the buying for the government cow scheme. Four head of milking Short-horns were supplied to the Birtle Demonstration Farm and five Holsteins were for the Killarney Demonstration Farm. The balance, either grade or pure-bred Holsteins, were supplied to farmers who were anxious to secure additional milch cows.

Delegates of the United Farmers of Alberta, after investigating the operations of the Fraser Valley Milk Producers' Association, unanimously recommend that the Milk and Cream Committee of the United Farmers of Alberta take steps toward the establishment of an organization similar to the Fraser Valley Association. The Fraser Valley Milk Producers' Association grew out of the Milk and Cream Shippers' Association. It controls the manufacture of butter and cheese made within the radius of its membership and handles sixty-five per cent of the retail milk business of Vancouver. It has 1,400 members and is credited with having saved hundreds of thousands of dollars to the producers within the past two and a half years.

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CITY CONDUCTS PRODUCE MARKET

Houston, Texas, which has a municipally owned retail market house, has taken over three stalls in the market building and is handling fruits and vegetables in competition with its tenants. In order to be fair to other retailers it charges itself with all overhead expenses paid by other dealers, including rent, and also pays wages higher than those paid in other stalls. Reports on 10 weeks operation of the city-managed stalls show that it is possible to buy and sell produce in competition with local merchants at both a direct and indirect saving to consumers. The experiment is to be enlarged to include food products other than fruits and vegetables and is said to be already serving as a stabilizing influence on prices in that city market. Competing merchants have become interested in the methods of doing business of the city-operated stalls and appear anxious to try out practices that would enable them to lower their prices.

PART V

The International Institute of Agriculture

FOREIGN AGRICULTURAL INTELLIGENCE

All communications in regard to this section should be addressed to T. K. Doherty
International Institute Commissioner, Department of Agriculture, West Block, Ottawa.

SCIENCE AND PRACTICE OF AGRICULTURE

GENERAL INFORMATION.

Report of the Food (War) Committee of the Royal Society on the Digestibility of Breads.—*Food (War) Committee, Royal Society*, pp. 36, London, 1918.

This report includes a comparison of the digestibility of breads made from wheat flour at 80 and 90 per cent extraction; a study of the digestibility of bread made from flour of which four-fifths was wheat at 80 per cent extraction and one-fifth was maize; and studies of the dietetic effect and of the palatability of bread made from wheat flour of 90 per cent extraction, either alone or diluted with cereals other than wheat, upon groups of people of varying ages and occupations.

The results obtained in feeding experiments on individuals led to the following conclusions: Breads made from 90 per cent flour are not so completely utilized as those made from 80 per cent flour, since when used as part of an ordinary mixed diet the coefficient of digestibility of the entire diet was 94.5 per cent in comparison with 96.4 per cent when breads made of the 80 per cent extraction were used. The coefficient of digestibility for the nitrogenous constituents of the diet in the case of the former is 87.3 per cent and the latter 89.4 per cent.

The observations indicate that bread made of flour of 90 per cent extraction has no ill effects upon health and will mean a gain in food value for every 100 lbs. of wheat of 13,000 total calories and 1.56 of protein.

Bread made from flour containing 80 per cent wheaten flour and 20 per cent coarsely dressed maize flour proved to be as digestible as bread made from the same wheaten flour without admixture. Bread containing 20 per cent maize was well digested by children even when eaten in proportionately large quantities.

It was found that bread made from flour containing 80 per cent of wheat flour of 90 per cent extraction with an admixture of 20 per cent other cereals, namely, 10 per

cent barley and the remainder maize and rice, or rice alone, was palatable and caused no digestive trouble.

Details pertaining to these observations are given in the following appendices: The Milling and Baking Processes; Nature of the Wheat and Maize Flours Employed; and Flour Used and Method of Baking, by A. E. Humphries.

CROPS AND CULTIVATION.

The Partial Sterilization of Soils.—TRUFFAUT, G., in *Comptes Rendus de l'Académie d'Agriculture de France*, Vol. 4, No. 38, pp. 1030-1038, 1049-1057, *Comptes Rendus de l'Académie de Science*, Vol. 167, No. 12, pp. 433-436. Paris, 1918.

Comparative tests in pots and in the field of carbon bisulphide, pure calcium sulphide, and calcium sulphide containing zinc sulphide naphthalene, anthracene, toluene, benzene, and heavy oils, are reported.

Treatment of the soil with carbon bisulphide increased the yields of cabbage and onions and appeared to prevent disease and insect attacks. Pure calcium sulphide also increased the yields of various plants, but calcium sulphide containing 10 per cent of zinc sulphide gave smaller yields than were obtained with the pure compound. The other substances named increased the yields of cabbage, but the beneficial effect was less pronounced in case of godetias, crude anthracene in the amounts used, even acting unfavourably. Mixtures of calcium sulphide and the aromatic hydro-carbons named were beneficial. The general conclusion is that partial sterilization hinders the development of animal and vegetable parasites, and also promotes the utilization of the reserve plant food of the soil.

The Water Reserve in Soils in Time of Drought.—DUMONT, J., in *Revue Scientifique*, Vol. 56, No. 16, Paris, 1918.

It was found that the moisture content was influenced to a large extent by manure. Heavy applications of manure incorporated

with the soil maintained a considerable percentage of moisture (17.8 per cent) in the surface soil during drought. As a result the crop (sugar beets) on all manured plots made good growth and apparently did not suffer from lack of moisture, while the sugar beets on the unmanured plots suffered much injury from lack of moisture, especially in the earlier stages of growth. The experiments emphasize the importance of an adequate supply of moisture in the surface soil, particularly at the beginning of crop growth.

696.—The Use of Ammonium Nitrate as a Fertilizer.—RUSSELL, E. J., in *Journal of the Board of Agriculture*, February 1919, pp. 1332-1333, London.

The general results of the Rothamsted experiments made with ammonium nitrate on potatoes, mangolds, and wheat may be summarized as follows:—

Ammonium nitrate is an excellent fertilizer, the nitrogen of which is worth as much as that in nitrate of soda and sulphate of ammonia.

It contains more than twice as much nitrogen as nitrate of soda, and one and three-quarters times as much as sulphate of ammonia; it is thus the most concentrated nitrogen fertilizer obtainable on the large scale. Where 1 cwt. of nitrate of soda or $\frac{1}{2}$ -cwt. of sulphate of ammonia is ordinarily used, less than $\frac{1}{2}$ -cwt. of nitrate of ammonia would be required.

It can be applied to any crop for which nitrate of soda is suitable, but it is not superior to sulphate of ammonia for potatoes, and may be inferior. Its proper use is as a top-dressing, and not as a constituent in mixed manures.

Farmers must insist on having the "non-deliquescent" variety, otherwise they will certainly be inviting trouble.

While the material itself is not inflammable, it yet helps a fire considerably. Great care is, therefore, necessary not to store under conditions where a fire might be started.

The Significance of the Sulphur in Sulphate of Ammonia Applied to Certain Soils.—LIPMAN, C. B. and GERICKE, W. F., in *Soil Science*, Vol. V, No. 1, pp. 81-86, Baltimore, 1918.

Supplementing previous work, the authors describe pot experiments conducted at the California Experiment Station, with barley grown on Oakley blow sand in the greenhouse to determine the role of sulphur when used in conjunction with various nitrogenous fertilizers.

Two parallel series of pots were run, one receiving nitrogen at the rate of 1,000 lbs. of dried blood per acre in the form of sulphate of ammonia, nitrate of soda, nitrate of lime, and dried blood; and the second receiving the same nitrogenous fertilizers plus sulphur, as flowers of sulphur, sulphuric acid, and sodium sulphate, in amounts equivalent to

the sulphur contained in the sulphate of ammonia application alone. Untreated pots and pots receiving sulphur alone were used as control. Tabulated data, gathered at the end of the growing season, which show the number and height of shoots; the number of heads; and the yields of straw, grain, and roots obtained in the experiments are fully discussed.

The results are held to indicate that sulphate of ammonia is far superior to the other nitrogenous fertilizers for barley on this soil; that sulphur in all of the forms tested, when supplementing nitrate or dried blood, induced marked increases in barley growth over that obtained from nitrogen alone; and that sulphur alone was practically without effect. In view of these results, the improvement of these and similar soils in the State is deemed to depend chiefly upon the supplying of nitrogen in some readily available form until the nitrogen and organic matter content of the soil has been increased by green manure and by nitrogen-fixing bacteria. For the best results with annual crops, sulphur in some form, probably as flowers of sulphur, is needed to supplement the nitrogenous fertilizers, unless sulphate of ammonia is used.

The Effect of Unbalanced Fertilizers.—

SCHNEIDEWIND, W., in *Illustrierte Landwirtschaftliche Zeitung*, vol. 37, pp. 493-494, Berlin, 1917.

In plat experiments on soil which had not received any phosphoric acid for 14 years, it was observed that the best results were obtained with a combination of potash, nitrogen, and phosphoric acid, and that potash and nitrogen increased the yields more than potash alone. On soil that had received no nitrogen for 14 years the yields were considerably greater with potash, phosphoric acid, and nitrogen than with potash and phosphoric acid only, although the potash and phosphoric acid combination produced noteworthy increases of yield.

The conclusion was reached that potash salts increase the availability of soil nitrogen and phosphoric acid to only a limited extent, of no practical significance. The effect of unbalanced potash fertilizers is, therefore, solely that of the potash. No great significance can be attached to the effect of lime fertilization on the formation of nitrates in the soil because most cultivated soils contain all the lime required.

The crops used in the experiments were sugar beets, potatoes, wheat and barley.

Relative Efficacy of the Different Phosphatic Manures.—*Scottish Journal of Agriculture*, Vol. I, No. 2, pp. 196-198, Edinburgh, April, 1918.

The results of one year's experiments at Kilmarnock, Scotland, comparing superphosphate (8 cwt. per acre), basic slag, bone meal, dissolved bone, ground mineral phosphate, guano, etc., on potatoes, are sum-

marized and discussed. The phosphates were applied in quantities furnishing equal amounts of phosphoric acid, in connection with a basic fertilizer supplying potash in the form of sulphate (2½ cwt. per acre), and nitrogen in the form of ammonium sulphate (2 cwt. per acre). The soil was a uniform medium loam on which a crop of oats had been grown the previous year, but which prior to that time had been in grass for many years and was apparently so well supplied with organic matter that no manure was used.

The yields were directly in proportion to the solubility of the phosphate used, the relative order of efficacy being superphosphate, basic slag, and dissolved bone, with mineral phosphate giving much the poorest yield. The superphosphate gave not only the largest yield but also the most profitable return. The general conclusion is drawn that the application of readily available phosphatic fertilizer is a factor of very great importance in increasing the production of potatoes.

Autumn vs. Spring Manuring.—*Journal of the Department of Agriculture and Technical Instruction for Ireland*, Vol. 18, No. 2, pp. 142-150. Dublin, 1918.

Experiments are described in a comparison of fall and spring applications of manure alone and of manure supplemented with spring applications of commercial fertilizers for potatoes, mangels, and turnips during the period of 1913 to 1916, inclusive.

Fall applications showed average yields of potatoes of about 397.6 bushels per acre for manure alone and 480.6 bushels for manure and commercial fertilizers, as compared with 432.6 and 491.8 bushels for the spring applications. Yields of mangels amounted to about 31 tons for manure applied alone in the fall and 37.9 tons for manure and commercial fertilizers, while similar applications in the spring showed average yields of 34.1 and 39.6 tons, respectively. Turnip yields amounted to 23.2 and 25.7 tons, respectively, for fall applications of manure and of manure and fertilizers, while spring applications produced yields of 28.5 and 27.7 tons, respectively.

Fertilizing and Cultural Experiments With Irish Potatoes.—WHITE, T. H., in *Maryland Experiment Station Bulletin* 215, pp. 151-174, College Park, Md., 1918.

This bulletin presents the results of experimental work conducted during the past four years. In fertilizer tests with early potatoes, the average maximum yields obtained for the three years 1915 to 1917 inclusive, amounted to 256.3 bushels per acre with an application of 200 lbs. each acid phosphate and nitrate of soda and 50 lbs. muriate of potash, as compared with 172.1 bushels for the check. Fertilizers containing from 5 to 7 per cent potash from muriate showed an average increase of 23 bushels per acre over those containing no potash. Observations

of the effects upon the stand of different amounts of fertilizers indicated that where the quantity exceeded 400 lbs. per acre, the excess should always be mixed with the soil to avoid injury to the seed piece. Treating the cut seed pieces with various substances resulted in better stands than from untreated seed when either flowers of sulphur, air-slaked lime, raw rock phosphate, or dry Bordeaux mixture was employed, while acid phosphate and wet germicides proved to be injurious.

Ordinary level cultivation as compared with the so-called ridge cultivation practised in certain sections of Maine resulted in average yields of 223.8 and 205.6 bushels per acre, respectively.

Whole seed pieces of White McCormick about the size of hen eggs produced 269.9 bushels per acre, as compared with yield of 219.8 bushels from similar seed cut in two pieces and 184.9 bushels when cut into four pieces.

Late dug Irish Cobbler placed in a warm room for about a month before planting sprouted sufficiently so that the plants came up and matured as soon as Maine-grown seed. In a comparison of home-grown August planted, Virginia second crop and Maine-grown seed of Irish Cobbler, average yields were obtained amounting to 191.8, 195.8, and 173.1 bushels per acre, respectively. Owing to marked differences in yield, however, it is deemed more profitable to grow White McCormick and buy Irish Cobbler seed for early planting. The Virginia second crop or the home-grown August planted seed could be cut so as to plant a greater area than Maine-grown seed, due to the smaller size of the tubers, but this was not regarded as a good practice, since smaller yields resulted from the use of small seed pieces.

Selecting eight different types of White McCormick for three successive years failed to give an increase of the desired types. One hundred selected hills of this variety were grown for four years in a comparison of yields, but no superiority of one selection over another appeared. The average yield of the lightest hills was slightly greater than the average yield of the heaviest hills.

A number of seedlings grown from seed balls of White McCormick are said to include practically all the types which had been sought by selection from the original stock by the hill-selection method and these are to be used in further efforts to improve the variety.

707—Respiration of Stored Wheat.—BAILEY, C. H., and GURJAR, A. M., in *Journal of Agricultural Research*, Vol. XII, No. 11, pp. 685-713. Washington, 18 March, 1918.

The preservation in storage of large quantities of thrashed grain necessitates measures, not only for protection from parasites, but also against dampness which causes the

grain to heat and become decomposed. That respiration is the cause of heating of damp grain was not known until comparatively recent times.

The authors made, at the Minnesota Agricultural Experiment Station, special investigations on the respiration of grains. They define respiration as "the release of energy through the biochemical oxidation of organic compounds as accelerated by certain enzymes." Since the grain itself is a poor conductor of heat, it follows that the heat energy released through respiration accumulates in the mass in proportion to its bulk so that the increase in temperature may in time become very marked.

In these experiments the carbon dioxide evolved by stored wheat was measured, and from that data the rate of respiration was calculated. (Truog's (1915) method and absorption tower was used for this purpose, the tower being slightly modified, in order to adapt it to the work in hand. The data thus obtained, expressed in milligrams of carbon dioxide respired for 24 hours for each 100 grams of dry matter, are collected in tables and shown in diagrams. The rate of respiration was studied in its relations with different factors, moisture content of the grain, consistency of the wheat kernel, soundness of the wheat kernel, period of dampness (length of time the excess moisture responsible for the dampness has been present), temperature, quantity of carbon dioxide accumulated, respiration in oxygen-free atmosphere.

Deductions from these investigations support the findings of earlier investigators that spontaneous heating in damp grain is occasioned by the biological oxidation of dextrose and similar sugars, chiefly in the germ or embryo of the kernel.

Moisture is one of the determining factors in respiration. It establishes the comparative rate of diffusion between the several kernel structures. Any gain in the moisture content of the kernel accordingly increases the rate of diffusion and, simultaneously, the rate of respiration. The increase is gradual and fairly uniform until the moisture exceeds 14.5 per cent, in the case of plump spring wheat, when it is markedly accelerated.

Density of the wheat kernel generally parallels the gluten content. Gluten possesses the property of imbibing more water than starch, and thus varying percentages of gluten result in varying degrees of viscosity at the same moisture content. The relative viscosity affects the rate of diffusion and this in turn directly affects the rate of respiration. The soft, starchy wheats thus respire more rapidly than hard, vitreous wheats containing the same percentage of moisture.

Plumpness of the wheat kernel affects the rate of respiration, as shown by contrasting plump and shrivelled grain. The shrivelled wheat respired two to three times as much as did the plump wheat at moisture contents above 14 per cent. At percentages of

moisture below 14 per cent the difference is not very marked. The high acceleration of respiration in shrivelled wheat containing more than 14 per cent of moisture is attributed to the higher ratio of germ to endosperm and hence the larger percentage of enzyme to substrate as compared with plump wheat.

The period of dampness—that is, the length of time the excess moisture has been present in the wheat—bears a relation to the rate of respiration. This is shown by comparing the respiration of freshly dampened wheat with that of naturally damp grain and with grain that had been dampened and stored for varying lengths of time. The curve of respiration diverges from that of freshly dampened wheat when the moisture content exceeds 12 per cent, and this divergence is more marked after 13 per cent of moisture is reached. In the case of wheat dampened and stored the quantity of carbon dioxide respired varies directly with the number of days the wheat remained in storage. The temperature at which the grain is stored affects the rate of diastatic action thus increasing the quantity of substrate available to the respiratory enzymes. This is indicated by the greater rate of respiration of wheat stored at room temperature than that stored at the outdoor temperature during the winter months.

Unsoundness of wheat caused by the freezing of the unripe plant results in higher respiratory activity in the threshed grain. This was shown by comparing moderately and badly frosted wheats with sound wheat. The frosted wheat respired more vigorously than the sound wheat. This was attributed to the arresting of the synthetic processes on freezing, and subsequent activities of the hydrolytic enzymes on thawing of the frozen wheat. The accumulation of glucose as the result of starch hydrolysis furnishes larger quantities of substrate to the respiratory enzymes.

Increasing temperatures accelerate the rate of respiration until 55°C. (131°F.) is reached. As the temperature rises the diastatic action upon starch increases. A point is reached, however, at which the enzyme activity diminishes.

Accumulation of carbon dioxide in the respiration chamber decreases the rate of respiration. The mean rate by four-day intervals is highest for the first four days and diminishes materially in successive periods.

Respiration is reduced in an oxygen-free atmosphere, the ratio to that occurring in a normal atmosphere being about 1 to 2.5.

Variation and Correlation in Wheat, with Special Reference to Weight of Seed Planted.—ARNY, A. C., and GARBER, R. J., in *Journal of Agricultural Research*, Vol. 14, No. 9, pp. 359-392, Washington, D.C., August 26, 1918.

Data are presented showing the results of a preliminary study of the size of individua

seeds of wheat in relation to the resultant plants. These experiments were made at the Minnesota Experiment Station during 1914 to 1917, inclusive, to aid in a more accurate explanation of similar trials now in progress under field conditions. The study involved careful observations of the reactions to environment of plants grown from accurately weighed seeds of various sizes. The results have been subjected to a statistical interpretation. The variability, both of the seed used and of the resulting plants, is indicated by the use of means, standard deviations, and coefficients of variability, while the degree of relation between the weight of the seed and characters of the resultant plants and the degree of interrelation between characters of the resultant plants are shown by correlation coefficients. Rainfall and temperature data are also included. Marquis wheat was used throughout the experiment, and the seeds were hand-selected, weighed to the fourth decimal place, and planted 4 inches apart in 4-inch rows. Observations were made on 2,048 plants. The conclusions reached have been summarized as follows:

The magnitude of the means for any of the characters studied varied with the environmental conditions. Lower yields of straw resulted from a reduction in number, total length, or average length of culms per plant, and lower yields of grain from a reduction in the number of kernels. With normally developed kernels, low yields were accompanied by a higher average weight per kernel. A reduction in the magnitude of the means was generally accompanied by less variability, although a number of exceptions occurred.

Correlation between weight of seed sown and resultant plant characters at maturity was not high in any instance, and is thought to be capable of such modification by environmental conditions that the relation may be slight or obliterated entirely. Correlation between plant characters was modified by environment, the degree varying with the characters considered. An increased yield of kernels was very closely accompanied by an increase in number of kernels, number of culms, and total length of spikes, and was somewhat less closely accompanied by an increase in average weight of kernels per plant, average height of culms, and average length of spikes. A large number of culms per plant was accompanied by a greater total length of spikes, but not by a greater average length of spikes.

Average weight of kernels was substantially and fairly consistently correlated with yield of kernels, and, subject to radical change due to environment, moderately correlated with average length of spikes. With number of kernels the correlation was rather low but always consistent. The average weight of kernels was practically independent of the average length of spikes.

There was a distinct tendency for greater average height of culms to be accompanied

by a greater average length of spikes, number of kernels, and higher yield of kernels. Average length of spikes was moderately correlated with average weight of kernels three years out of four. The correlation between average height of culms and a number of culms was always low. There was a distinct tendency for plants of varying height at second leaf to maintain the same relative heights at six weeks, but there was a lesser tendency for this relation to be maintained at maturity.

A list of 17 titles, comprising the literature cited, is appended.

685—Subsoiling, Deep Tilling, and Soil Dynamiting in the Great Plains of the United States.—CHILCOTT, E. C. and COLE, J. S., in *Journal of Agricultural Research*, Vol. XIV, No. 11, pp. 481-521 Washington, D.C., Sept. 9, 1918.

In this article results are reported of subsoiling at 12 stations of the Office of Dry Land Agriculture Investigations, situated in the Great Plains area, for a total of 66 station-years, or an average of 5½ years at each station. From 4 to 7 crops have been grown each year at each station. The crops under trial have been spring wheat, winter wheat, oats, barley, flax, corn, kafir, milo, broom corn, sorghum, and cotton. The length of time covered and the wide range of climatic conditions encountered in these experiments make the results representative of the widest range of conditions likely to be experienced in the region.

The results with subsoiling are all from continuous cropping of land to the crop under study. There are in general five methods under trial: spring ploughing, fall ploughing, alternate cropping and summer tilling, subsoiling, and listing. The results are shown in 19 tables, and are summarized as follows:

Subsoiling, deep tilling, and soil dynamiting are all operations that increase the expense of production over that of ordinary ploughing. They also increase the amount of labour expended on a given area, or reduce the acreage that can be prepared by a given working unit. Subsoiling is as laborious and expensive an operation as ploughing, but must be done in addition to it and at the same time. Ploughing with a special deep-tillage machine to a depth of 12 to 14 inches requires considerably more than double the labour, time, and expense of ordinary ploughing. The use of dynamite in the least quantity that might be effective involves an added expense for material and labour of more than \$20 per acre. Consequently, in order to justify their use, these practices should show increases in yields sufficient to pay for the extra expenses involved.

In any year a combination of conditions favourable to subsoiling may occur at any station. At some stations the average results of a series of years shows no measurable effect on crop yields as a result of subsoiling. At other stations the effect has

clearly been to decrease yields. At still other stations, particularly at Hays, Kans., subsoiling appears to have resulted in insignificant increases in crop yields. With some of the crops showing increases, however, the yields from either method have been too small to be profitable.

Recognizing the fact that there may be times and places giving results favourable to subsoiling or other methods of deep tilling, the average yields obtained in the extensive experiments here reported seem to warrant the conclusion that as a general practice for the Great Plains as a whole no increase of yields or amelioration can be expected from the practice.

In their relative response to deep tillage there is no marked difference to be observed between crops.

Subsoiling and deep tilling have been of no value in overcoming drouth. The effect, on the contrary, apparently has been to reduce the yields in those seasons that are below the average in production.

Experiments have been conducted with the subsoil plough, the Spalding deep-tillage machine, and dynamite. The effect or lack of effect of deep tillage appears to be essentially the same, irrespective of the means by which it is accomplished.

These conclusions are the results of extensive experiments covering a wide range of crops, soils, and conditions in the Great Plains. Experiments conducted in the Great Basin under semi-arid conditions with the greater part of the precipitation occurring in the winter; under humid conditions in the States of Illinois, Pennsylvania, and Mississippi; under semi-arid conditions at San Antonio, Tex.; and under semi-arid conditions on the black soil of southern Russia have all led to the same conclusion; that yields cannot be increased nor the effects of drouth mitigated by tillage below the depth of ordinary ploughing.

The quite normal popular belief in the efficiency of deep tillage as a means of overcoming drouth or of increasing yields has little foundation of fact, but is based on misconceptions and lack of knowledge of the form and extent of the root systems of plants and of the behaviour and movement of water in the soil.

Farm Practice in Growing Sugar Beets for Three Districts in Utah and Idaho, 1914 and 1915.—MOORHOUSE, L. A., SUMMERS, T. H., WASHBURN, R. S., and JONES, J. W., in *United States Department of Agriculture, Bulletin 693*, p. 44. Washington, D.C., 1918.

This bulletin presents data obtained in a detailed study of field operations and their related costs in 1914 and 1915 in the production of sugar beets upon 173 farms in three representative areas situated near Provo and Garland, Utah, and Idaho Falls, Idaho. The total costs are based upon the production of 1,461 acres of sugar beets in

the Garland area, 833 acres in the Provo district, and 735 acres in the vicinity of Idaho Falls. The average yields varied from a little more than 13 tons per acre for the Idaho Falls area to about 15 tons for the Provo and Garland districts. Data as to the cultural operations are summarized in tabular form and fully discussed. The results obtained may be briefly noted as follows:

The most important differences in the field practice employed were found in such operations as manuring, ploughing, disking, harrowing with the spring-tooth harrow, cultivating (some using a 1-man-1-horse crew and others a 1-man-2-horse crew), and performing the hand labour (some utilizing the available farm help, while others had this done on a contract basis).

There was a direct relation between the distance the beets were hauled and the cost per ton for marketing.

Labour costs constituted from 54.4 per cent to 58.3 per cent of the total expense of production. This included all man and horse labour as well as the contract labour. The next largest item was interest on investment in land, approximating 23.3 per cent of the total costs in the Garland area, 25.5 per cent at Provo, and 21.1 per cent at Idaho Falls. The total cost of production was \$69.03 per acre, or \$4.65 per ton for the Garland district; \$69.59 per acre, or \$4.65 per ton, for Provo; and \$62.68 per acre, or \$4.60 per ton, for Idaho Falls. The total credits per acre were \$74.40 at Garland, \$74.20 at Provo, and \$69.46 at Idaho Falls, the estimated value of the beet tops being included in these credits.

In the Garland and Provo areas sugarbeet production proved to be the most important enterprise of the farms under observation, over 40 per cent of the total farm receipts being secured from the sale of sugar beets. At Idaho Falls sugar beets and potatoes were found to be of about equal importance.

The yield per acre is deemed to be an essential factor in reducing the cost per ton and consequently in increasing profits, and any change in the system of farm management that will contribute to increased yield without materially increasing the cost of production should receive the consideration of the grower. A study of the returns on these farms is said to emphasize the fact that a large number of operators did not have a margin of profit after allowance had been made for all expenses connected with the production of the crop, including interest on investment.

Experiments With Truck Crops.—MONTGOMERY, C. W., in *Ohio Experiment Station Bulletin 323*, pp. 397-409. Wooster, Ohio, 1918.

A progress report on fertilizer experiments with sweet corn, cucumbers, cabbage, and tomatoes, which are being grown on some 36 plats, some of which receive no fertilizer,

and others receive commercial fertilizer, lime, and manure, both alone and in varying combinations. The results for the seasons 1916 and 1917, including the average results for the three seasons 1915-1917, are presented in tabular form and discussed.

Although no definite conclusions are derived from the work at this time the data secured indicate that acid phosphate used alone will give higher net gains under prevailing prices of fertilizers and crops than stable manure used alone. Still greater net gains are obtained when acid phosphate is used in conjunction with nitrate of soda and with stable manure or with both. When added to a complete fertilizer, ground limestone has apparently increased the net gain. Limestone has been less useful on tomatoes than on either corn, cucumbers, or cabbage.

721—Relation of Varying Degrees of Heat to the Viability of Seeds.—BURGESS, J. L., in *Journal of the American Society of Agronomy*, Vol. XI, No. 3, pp. 118-120. Lancaster, Pa., March, 1919.

The practical difficulties found in the use of carbon disulphide for the destruction of insects and insect eggs in stored seeds have suggested the idea that heat might, under certain conditions, replace it in the control of insect pests.

The author undertook to establish what effect the treatment of seeds with heat for the destruction of insects has on the viability of the seeds. While a high temperature, short of burning, may not seriously injure the edible quality of grains, there is no question but that great care must be taken to find the critical temperature above which the viability of these grains will be lowered. With a view, therefore, of ascertaining the critical temperature for various seeds the North Carolina Seed Laboratory undertook a series of temperature tests. The experiment was run with corn, wheat, oats, rye, cowpeas, soybeans, and garden beans—seeds most liable to insect depredations.

The results of the experiment are summarized as follows:

A temperature of from 140 to 158 degrees continued through five hours had no appreciable detrimental effect on the viability of garden beans. No check test was used.

Cowpeas were more susceptible to the influence of heat and were almost killed by a temperature of 194° continued through a period of 5 hours, while a temperature of 140° for 1 hour did not seem to effect the viability to any great extent. No check test was used.

Tests with field corn were not satisfactory, as there were only two tests to which any importance could be attached. These showed that 176° for 1 hour reduced the viability to 68 per cent, and for 3 hours to 32 per cent. The check test showed a germination of 94 per cent.

Results with oats were also unsatisfactory, but three tests proving of interest. These

three tests seemed to show no appreciable difference in the effect on the seed of a temperature ranging from 140° to 194°, running through periods of 1 to 5 hours. Due to what must have been an experimental error, the check test showed lower viability than the heat tests.

In tests of rye temperatures of 176° to 212° carried through 5 hours showed practically no detrimental effect on the viability of the seeds. A temperature of 230° for 2 hours reduced the viability to 78 per cent, however, and a temperature of 248° for 5 hours killed the seed.

Wheat was seriously affected by high temperatures. The viability in this test was reduced to 60 per cent by a temperature of 230° carried through 1 hour and to 55 per cent by the same temperature carried through 3 hours. The germ was killed by a temperature of 248° carried through 1 hour. The check showed a viability of 92 per cent.

It will be noted that the lowest temperature used, 140° F., was 10° higher than that found by Professor Dean to be sufficient to kill insects. This temperature, and very much higher temperatures, some as high as 194° F., seemed to show no detrimental effect on the viability of soybeans, oats, and rye. It is not known whether these temperatures will kill insect eggs.

Shortage in Sugarbeet Seed in the United States in 1921.—*United States Weekly News Letter*, Washington, D.C., October 15, 1919.

The United States Department of Agriculture has announced that there will be a shortage of sugarbeet seed in the United States for the 1921 plantings unless the beet sugar companies and seed growers arrange immediately for the production of a large part of their requirements for that year.

The sugarbeet seed situation for 1921 is serious because of the limited production of sugarbeet seed in Europe as compared with former years, because of the increased activity in beet sugar production in European countries, and because of the increased acreage planted to beets in the United States in recent years. It is probable that several years will elapse before normal quantities of sugarbeet seed will be produced in European countries. American growers, therefore, must depend to a considerable extent upon home-grown sugarbeet seed. There seems to be no good reason why the United States should not produce its full requirement of sugarbeet seed annually. The domestic production of sugarbeet seed, now totalling millions of pounds, has demonstrated that sugarbeet seed of the highest quality may be produced in that country.

The present indications are that there is sufficient sugarbeet seed, either imported or domestic, now in the hands of nearly all of the beet sugar companies in the United States to take care of the entire acreage to

be planted to sugar beets in 1920, but that there is very little foreign sugar beet seed now available for importation, and that the foreign production in the immediate future will be limited. Since sugar beet seed stored under normal conditions will retain its vitality for several years, it would be advisable for sugar companies to secure any sugarbeet seed of good quality now available and not more than 2 years old.

The domestic beet-seed production is increasing rapidly. In 1918 about 6,000 acres of sugar beet seed were grown, while in 1919 upward of 10,000 acres were planted to beet roots for seed in the United States. Unfortunately, drought interfered with a normal production of sugar beet seed in some localities this past season, but the resulting reduction in yield was local and temporary and should not prevent or retard the efforts that are being made to produce in the United States an adequate supply of sugar beet seed to meet the American requirement for 1921 and the years following.

In order to produce a crop of seed next year for the 1921 planting, it will be necessary to select the beet roots this fall, pit them so that they will not freeze during the winter, and plant them as early as soil and weather conditions will permit next spring.

The Effect of Cross-Pollination on Size, Colour, Shape, and Quality of the Apple.—Wicks, W. H., in *Arkansas Agricultural Experiment Station Bulletin* 143, pp. 19, Fayetteville, Ark., 1918.

This paper reports the results of investigations during the three years 1915-1917 relative to the effect of cross-pollination on size, colour, shape, and quality of the apple. The Ben Davis, Jonathan, Winesap and Grimes varieties were used, inasmuch as they were found to bloom at the same time in a previous cross-pollination study. A resume is given of some literature discussing the effect of environment and cultural practice upon apple characters, together with a bibliography of cited literature.

As a result of this study the author found that no influence of any variety used as a cross-pollinizer could be detected on size, colour, shape, and quality of the fruit of the female parent. It is concluded that apple growers are justified in planting varieties primarily for the benefit of cross-pollination to secure the normal development of the apple. The greatest mutual affinity was found to exist between varieties crossed as follows: Den Davis (female) x Grimes, Grimes (female) x Jonathan, Grimes (female) x Ben Davis, Ben Davis (female) x Jonathan.

A review of the work of other investigators taken in connection with observations made during the present study serves to confirm the data secured and shows that variation in apple characters is caused more by various environmental and cultural factors than by cross-pollination.

LIVE STOCK AND BREEDING.

Water Requirements for Milk Production.—McCandlish, A. C., and Gaessler, W. G., in *Journal of Dairy Science*, Vol. II, No. 1, pp. 4-8, Baltimore, January, 1919.

The importance of water in the animal dietary is appreciated and the special emphasis required by the water supply of the dairy cow can be easily recognized from the fact that milk consists of approximately 87 per cent water and 13 per cent of solid constituents.

Experimental work was undertaken by the authors to determine if possible the amount of water, in addition to that in the feed, which was required for milk production when the cows were receiving succulent feed during the hot dry weather of summer. The ration fed consisted of the soiling crops being used in the general herd feeding—oats and Canada field peas, alfalfa, amber cane and cowpeas, and soybeans—with a grain mixture of 3 parts cracked corn, 2 parts ground oats, 1 part cottonseed meal, 1 part wheat bran, and 1 part old process oil meal. Water was offered to the animals twice daily and they were weighed before and after watering so that a record of live weight and water consumption could be obtained. Moisture records were kept on all feeds consumed.

The results of the experiments show that when soiling crops and grain are fed an average of about 350 pounds of water in the feed will be consumed for each 100 pounds of milk produced and in addition about 200 pounds of drinking water will be needed, making a total water requirement of practically 550 pounds per 100 pounds of milk produced under summer conditions.

One-Night Camps vs. Established Bed Grounds on Nevada Sheep Ranges.—Fleming, C. E., in *Nevada Experiment Station Bulletin* 94, pp. 21, Reno, 1918.

This bulletin describes the general method of handling sheep in summer on Nevada ranges, points out the advantages that would be gained by certain changes in the practice followed, and reports the results of experiments conducted to determine the practicability of handling sheep on the range in summer without returning each night to an established camp, and the effects of such a system on the sheep and the range as compared with the prevailing method of using permanent bed grounds until all the forage within a radius of from 1 to 3 miles is consumed.

During the summers of 1916 and 1917 three flocks each were studied under the one-night camp system and the established camp or bed ground system. A large uniform piece of range was selected so that differences in carrying capacity could be attributed only to the methods of handling the sheep. The total number of ewes and lambs in the six flocks under observation

for the two summers ranged from 2,067 to 2,638 per flock, and the areas grazed from 1,776 acres to 5,578 acres per flock.

The tables presenting the detailed results show that the sheep under the one-night camp system utilized only 1.82 acres per head per 100 days of grazing as compared with 2.33 acres under the established camp system, or an increase of 21.4 per cent in carrying capacity. This advantage is considered due mainly to the reduction to a minimum of the loss of forage through trampling, the possibility of regrazing areas at later dates, the reduced trampling of the forage due to the more open feeding of the flocks, the small waste of forage owing to the fact that sheep trail less when choice feed is available, the reduced packing of the soil with the consequent greater retention of soil moisture and better plant growth, and the more uniform utilization of the areas grazed.

For the purpose of determining the degree of range utilization under the two systems, a series of areas 6 feet square were selected on two different ranges before the grazing began and the total number of plants on each quadrat was ascertained. At the close of the grazing season the number of plants was recorded again and the degree of utilization noted. On the range with the grazed bed-grounds the quadrats were laid out from a central camp, so that each one was placed in a different zone. At the close of the season it was found that the percentage of the plants removed in the various zones was as follows: $\frac{1}{4}$ -mile zone, 97 per cent; $\frac{1}{2}$ -mile zone, 95; $\frac{3}{4}$ -mile, 93; 1-mile, 68; $1\frac{1}{4}$ mile, 48.4; $1\frac{1}{2}$ -mile, 20.5; $1\frac{3}{4}$ -mile, 14.1; and in the 2-mile zone no appreciable utilization. On the other range, under the bedding-out system, out of 32 quadrats an average of 84.4 per cent of the plants had been removed, leaving an average of 15.6 per cent of the forage unconsumed. On this range all areas were partly grazed at first and then regrazed later.

The comparative gains made by lambs under each system were determined by weighing 20 average individuals from each flock at the beginning and at the close of the grazing season. Under the bedding-out system the lambs grazing an average of 58.5 days made an average daily gain of 0.37 pounds per head, and under the established bed-ground method the lambs grazing an average of 63.8 days made a corresponding gain of 0.316 pounds, representing a difference of over 5 pounds in the weight of a lamb for a grazing season of 100 days.

Observations were also made on the effect of the type of range on the milk production of ewes. Two ewes of Rambouillet breeding when grazed on a range with coarse and more or less dry grasses produced an average of 1.6 pounds of milk per day. When then placed on a range with succulent forage their milk production immediately advanced to 2.1 pounds per day.

The effect of trailing on growth was observed on three lambs forced to trail from $1\frac{1}{4}$ to $2\frac{1}{4}$ miles to get to fresh feed. It was found that during an observation period of four days these lambs made each an average increase in weight of 0.25 pounds per day and that for four days after they were put on fresh green feed and the long trails eliminated they made an average daily gain of 0.32 pounds. This would represent a difference of 7 pounds in the weight of a lamb for a grazing season of 100 days.

RURAL ECONOMICS.

772—Value of Records to the Farmer¹.—

BALL, J. S., in *Year Book of the United States Department of Agriculture*, 1917, pp. 153-167, Washington, D.C.

The subject of farm accounts is one about which there are many misconceptions. We have been too prone to lay stress upon the mere formality; to make it appear that farmers were expected to believe that if they only had certain special kinds of books and forms the accounting would be easy and fruitful in results. Practically all farmers keep records of one kind or another, and the average farmer is not easily impressed with the notion that there is any special virtue in merely setting down columns of figures, yet there remains a class of writers on this subject who seem to think that if all farmers could only be persuaded to practise double-entry bookkeeping, all the problems of agriculture would be solved as by magic.

No one knows better than the practical farmer that there is nothing of the cure-all in the keeping of accounts on the farm. The practice will not of itself turn a poor farm into a rich one, a poor farmer into a good one, or losses into profits. Farm records, if accurately kept and intelligently utilized, are an aid to a better understanding and insight into one's business affairs, and are worth while in exact proportion to the accuracy and completeness of their recording and the pertinence of the use that is made of them. These are facts well-known to thousands of farmers who keep accurate accounts and make good use of them.

In beginning record-keeping it is of vital importance to have a clear understanding as to just what facts about the farm business should be shown by the records day by day and at the end of the year. It is as useless to start record-keeping without having thought over and decided on what you intend to have the records show, as to begin digging a foundation and hauling lumber for a building without first deciding on the kind

(¹) The following are some of the articles on agricultural bookkeeping published in the "Bulletin of Foreign Agricultural Intelligence": "Agricultural Bookkeeping on Peasants' Farms in Switzerland," April, 1913; "Bookkeeping among Farmers in Sweden," April, 1913; "Basis of International Statistics of Agricultural Bookkeeping," April, 1914; "Bookkeeping Associations in Denmark," December, 1914; "Farm Valuations for Bookkeeping Purposes," October, 1916; "A System of Accounting for Co-operative Fruit Associations," July, 1915.

and size of structure to be erected. No farmer would be so foolish as to start his teams to a field to work without first making up his mind what crop he intended to grow thereon. It would be quite as foolish to begin record-keeping without a definite idea of what facts about the farm business the accounts are designed to bring out.

When this is thought over and decided upon, the next step is to secure this information with the least amount of work and in the simplest way. The kind of books and forms used does not matter in the least, providing the records are complete and accurately kept—but a method is desirable that will promote facility in summarizing the records at the end of the year. The continued keeping of the accounts will often develop the most convenient form.

Usefulness is the test of value. The use that is made of farm accounts is the measure of their value to the farmer, and the simpler the accounts kept by the beginner, the greater the chance of them to prove of use.

Farm records may be roughly divided into two heads:

1. Records of happenings.
2. Records of money transactions

Simple accounts of everyday happenings are often of great use. Every farmer makes a note when a calf is born or a sow farrows. Many do so mentally only, but it is none the less a note. If such notes are written down in a way that makes reference to them easy, they become of much use in supplying needed information when memory fails. Notes recording other everyday happenings often prove useful. Among these may be mentioned the dates when animals are bred, men hired or discharged, accidents occur, pasture season begins and ends, first and last frosts occur, incubators are set, spring work begins and fall work ends, seed time and harvest occur, etc. Such notes as these when systematically recorded and constantly referred to are of much value. They enable one to take proper precautions as to feed and care of animals prior to the birth of young, thereby often saving both mother and offspring. Disputes with hired men as to wages are avoided by recording when they are hired, a wage agreement, and all amounts subsequently paid them. Accident records are of value when seeking redress for damages, pasture data when figuring on feed supply, and frost and other weather data in planning the year's work.

A record of the cash received and paid out is made by many farmers, but all the benefits to be derived from such records are seldom realized. The most important use made of them in many cases is as a means of checking up bills when sent in, to see whether all payments have been duly credited. The realization of even this small part of their full value sometimes makes such records well worth while. There is no reason why every farmer should not have such a check on his business dealings, and losses

can often be avoided by proving credits that have been overlooked by the storekeeper.

The cash account may be kept in any convenient form, but perhaps the simplest and most interesting way for a beginner is to use a diary. If this is done, part of the page may be used to record the daily happenings and the cash record made on another part of it, thus giving a complete record of the day, and in addition to the foregoing daily notes of personal affairs, ideas, and events may be jotted down, thus giving such records a personal touch, and making them of more than mere business significance and giving them colour that will make them of interest in the years to come. Any information wanted at the end of the year may be assembled from a diary account book in a few hours.

When the year's record is made the cash accounts can be assembled under headings that will show exactly what branch of the farm activities produced the dollars and what each required in the way of cash expenditure to keep it going. Some farmers are apt to judge of the importance of the various farm projects by the time it takes to put them through. To such, a complete cash record for a year, properly assembled, will be an eye-opener. Often seemingly unimportant things on the farm, such as the flock of poultry, produce nearly as much net cash as the obviously important. The year's cash summary helps the farmer to get a better perspective of these things.

In using such records as an aid to future plans, hasty conclusions should not be drawn, nor should snap judgments be taken. The fact that the hogs or the corn crop brought in the most net money last year is no reason for assuming that all the activities of the farm henceforth should be devoted to the sole purpose of hog or corn raising. It may be that the keeping of cows was partly responsible for making the hogs so productive of net cash, or that the growing of wheat, clover, or other crops in rotation with corn made the latter crop much more profitable than it would have been if grown alone. Similar conditions will be met with on all farms, and therefore no sudden changes should be made on the basis of what a few accounts may show.

On the other hand, a single year's figures will occasionally indicate that something is radically wrong; will show where the net expenses of one farm enterprise is a great drain on the net cash returns made by the others. All phases of such an enterprise should be carefully studied and unless the losses can be assigned to some reason, such as a bad season, temporarily adverse market conditions, epidemics, or similar unusual conditions, it may often be dropped with profit.

Comparison of the annual figures year by year is another source of profit from the use of accounts, since by such comparison a true

perspective and insight into the make-up of the business is gained.

The term "inventory" is used to designate a list of property, and such a list, made annually, is a most important and useful record. In any system of accounting the inventory is absolutely essential, as upon it is based the diversion of one year's business from another.

A farm inventory is simply a statement showing what the land, buildings, equipment, live stock, supplies, and produce on hand are worth at the time the inventory is made, together with amount of cash on hand and money owing to and owed by the farmer. It is a list of farm property and farm debts. It corresponds to the "stock taking" which every merchant does periodically.

The uses of the inventory are important and varied. As previously stated, it is the basis upon which is built the superstructure of accounting systems. Taken alone it will show a farmer exactly what he is worth and will be a guarantee of solvency and an aid in securing credits and loans from the bank in time of need. The inventories for two dates a year apart show whether progress or retrogression has occurred during the year, and definitely measure the degree of the change.

The foregoing discussion has embraced simple record-keeping. The accounts described deal almost exclusively with facts about the farm as a whole, as a unit, and serve to compare this year's business with that of last year or the year before. In order to keep accounts with the separate enterprises, however, to show the factors of cost and the returns of each, and what each one gains or loses, cost accounts are necessary.

Cost records, while of great use if correctly assembled and intelligently interpreted, can only be obtained by the outlay of considerable time and attention to detail. A man who works hard at manual labour all day can very rarely find the time and seldom has the inclination to set down daily all the minutiae necessary to complete cost accounts. In cost records there are added to the inventory and cash account, labour records, feed records, supply records, crop yield and animal production records, which, when the amount of time necessary to summarize and distribute the indirect costs is considered, require much more attention than can ordinarily be given. Only where the conditions seem to assure that the accounts will be pushed through the year to a successful conclusion should cost accounting be begun. Detailed accounts begun and abandoned are worse than time and labour thrown away. They are apt to give the idea that there is no use in keeping any records whatever.

However, cost data systematically recorded, summarized, and studied year by year, are of the utmost value to any farmer whose circumstances permit him to obtain them. The labour records will show just

how much labour and team work is required by each crop on the farm and the time of the season in which it is required. They show what proportion of the labour is devoted to work that produces income and the very considerable amount that is consumed by "odd jobs" on every farm. The proportion that labour cost is of the total in the production of all farm crops and stock is brought out, and the number of days of man and horse labour necessary to produce an acre of any crop or to care for any animal for a year.

A year's labour records show also just how much man-power and horse-power is necessary to run the entire farm every week in the year and point out accurately just when the rush seasons occur and how much help is necessary to tide them over handily. With such records before him a farmer knows approximately how much labour and how many horses he will need to carry out his plan of operation for the coming year. He knows how much more or how much less labour he will need for every acre of increase or decrease in area of any crop and just when such labour will be required or may be spared. Increasing or decreasing the magnitude of the different farm enterprises and fitting them together until a complete year's work with an even load of labour for the entire season, with the rush points minimized gives him personal control of unsettled labour conditions and puts him in an advantageous position to push through successfully the coming year's work.

Feed accounts, accurately recorded and summarized, will give valuable data on the amounts of grain and roughage required to put an animal on the market or to maintain the permanent herd. They give the quantities necessary to maintain the work stock, and thus enable the farmer to reserve sufficient for his needs and to sell his surplus feeds with safety. They enable the farmer to plan intelligently an increase or decrease in any of his herds and inform him just what changes will entail in increased or decreased quantities of feeds required. They supplement the other records in that they indicate how to preserve the balance between crops and stock on the farm and thus become the basis upon which is determined the proportionate charge to stock and credit to crops for farm-produced feeds consumed.

Records of crop yields, animal products obtained, and of supplies used by the different farm enterprises are the additional factors necessary to make cost data complete. These are useful in that they show just what yields of crop and by-product are obtained year by year, what and how much the animals produce, and by what farm departments miscellaneous supplies are used, thus permitting the making of adequate charges and credits.

When the cost records have been successfully carried through the year, all costs distributed, and the summarizing done, the

cost of every crop and of each class of stock will be known, together with the income each has produced, and the resulting profit or loss for each, with the cost per acre, bushel, ton, or animal. These will prove of great interest and usefulness in numerous ways.

The figures show the margin of profit and approximately what must be realized on each commodity produced in order to realize a profit or avoid a loss. Such figures for a series of years will be increasingly valuable.

TABLE I.—*Showing how cost accounts on an eastern North Carolina farm were utilized to show whether each farm department made a profit or a loss and how much.*

Farm enterprise	Income	Cost	Profit	Loss
Tobacco	\$1,039 25	\$ 388 83	\$650 42	
Corn for grain	145 25	355 01		209 76
Corn silage	337 50	362 44		24 94
Oats	65 00	90 54		25 54
Hay:—				
Clover	90 00	43 03	46 97	
Cowpea	120 00	88 33	31 67	
Rye	30 00	47 40		17 40
Truck crops	170 02	122 12	47 90	
Dairy herd	2 185 24	2,604 17		418 93
Hogs	227 50	145 30	82 20	
Poultry	193 05	76 54	116 51	
Sand pit	74 50	33 26	41 24	
Wood lot	358 00	265 82	92 18	
Outside labour	68 71	65 38	3 36	
Total	\$5,104 05	\$4,688 17	\$1,112 45	696 57
Net farm profit			\$415 88	

Where losses are sustained, the study of the facts for past years when profits were made may show why the losses occurred,

and influence the farmer to take heart for the future and strive to overcome, if possible the conditions that caused the losses.

TABLE II.—*Detail of the cost of growing potatoes on a western New York farm for a series of five years. A good illustration of the application of cost accounts in analyzing the cost of growing a crop.*

	1910	1911	1912	1913	1914	Five-year average
Acres grown	20.5	17.3	20.7	19.3	16.7	18.88
Per acre costs:						
Labour in growing—						
Man	\$ 7 61	\$ 7 36	\$ 7 82	\$ 8 10	\$ 5 78	\$ 7 33
Horse	10 67	8 50	9 65	8 41	6 76	8 80
Labour in harvesting—						
Man	5 46	5 29	4 36	4 22	4 93	4 85
Horse	4 65	4 92	3 74	3 20	3 17	3 94
Total labour cost—						
In growing	18 28	15 86	17 47	16 51	12 54	16 13
In harvesting	10 11	10 21	8 10	7 42	8 10	8 79
Total	28 39	26 07	25 57	23 93	20 64	24 92
Materials used—						
Manure	2 76	9 13	9 00	1 23	8 59	6 14
Seed	3 20	7 18	17 78	8 18	10 57	9 38
Fertilizer	8 13	13 10	9 14	10 32	10 04	10 15
Lime for spraying	0 48	0 41	0 44	0 54	0 15	0 40
Arsenate of lead	1 70	1 40	1 17	1 34	1 26	1 38
Sulphate of copper	1 48	2 97	2 53	3 45	2 43	2 57
Total cost of materials	17 75	34 19	40 06	25 06	33 04	30 02
Indirect costs—						
Implement cost	4 39	7 10	8 37	6 50	8 13	6 90
Interest and taxes	2 96	3 75	3 57	5 43	5 40	4 22
Overhead expenses	3 30	5 23	6 59	4 87	5 70	5 14
Total, indirect cost	10 65	16 08	18 53	16 80	19 23	16 26
Total, all costs	56 79	76 34	84 16	65 79	72 91	71 20

TABLE II.—Detail of the cost of growing potatoes on a western New York farm for a series of five years—Concluded.

	1910	1911	1912	1913	1914	Five-year average
Per bushel costs—						
Labour to grow	0 09	0 08	0 08	0 10	0 06	0 08
Labour to harvest	0 05	0 05	0 04	0 04	0 04	0 04
Total labour cost	0 14	0 13	0 12	0 14	0 10	0 12
Materials	0 09	0 16	0 19	0 15	0 15	0 15
Indirect cost	0 05	0 08	0 09	0 10	0 09	0 08
Total cost per bushel	\$0 28	\$0 37	\$0 40	\$0 39	\$0 34	\$0 35
Yield per acre, bushels	201	208	208	168	217	200.6
Selling price per bushel	\$ 0 40	\$ 0 55	\$ 0 49	\$ 0 60	\$ 0 28	\$0.464
Seed per acre	12.8	14.5	15.5	16.1	14.1	14.6
Seed cost per bushel	\$ 0 25	\$ 0 49	\$ 1 15	\$ 0 51	\$ 0 75	\$0 63
Fertilizer per acre, pounds	643	872	700	767	713	739
Cost per ton	\$25 32	\$30 02	\$26 93	\$26 93	\$28 29	\$27 31
Acres grown	20.5	17.2	20.7	19.3	16.7	18.88
Rates per hour:—	Per acre	Per acre	Per acre	Per acre	Per acre	Per acre
Man labour	\$0.153	\$0.141	\$0.156	\$0.171	\$0.169	\$0.158
Horse labour	0.177	0.143	0.148	0.120	0.130	0.144
Man hours per acre:—						
To grow	49 74	52 22	50 08	47 37	31 22	46 73
To harvest	35 68	37 55	27 95	24 72	29 10	31 01
Total	85 42	89 77	78 03	72 09	63 38	77 74
Horse hours per acre:—						
To grow	60 28	59 46	65 15	70 08	52 02	61 40
To harvest	26 29	34 40	25 27	26 63	24 37	27 36
Total	86 57	93 86	90 42	96 71	76 39	88 76

To obtain the greatest benefit from cost accounts, full data as to costs in quantities of labour, materials (as feed, seed, supplies, etc.), and the use of the farm equipment, should be recorded and carried along all through the process of summarizing. Hours of labour, pounds of grain, tons of fertilizer, etc., are equally as useful as the money figures, if not more so. Such data aid the farmer in getting a truer insight as to the facts and give him a firmer grip on his business affairs than can be obtained by money costs alone. Prices fluctuate, but the physical factors in the cost of production remain more or less constant; they constitute the best known source of information useful in the analysis of a farm business.

In making use of the results of a year's cost accounts for the purpose of perfecting the organization of the farm for the greatest profit, caution is doubly to be recommended. As previously stated, hasty conclusions should not be drawn. Sometimes a positive decrease in a year's profits may ensue if an enterprise be dropped because, taken alone, it has failed to pay. Cows, for instance, may not be showing a net profit, but if all the cows are sold, there may be no other profitable way of using up roughage which would thereby be wasted, resulting in a loss on the crop producing it. Labour devoted night and morning to milking and feeding cows, and charged to them, would be entirely

wasted if the cows were sold and nothing else supplied to utilize it. Thus an added labour burden would have to be borne by the other enterprises. It is much better that these things be utilized than that they should be a dead loss, even though the cow account alone just breaks even, or worse. Any changes indicated, if made, should be brought about gradually and the effects noted in their relation to all other farm activities.

There is nothing like a set of records as a means of analyzing a farm business. To use such records, however, the fundamental principles must be understood and complied with; their limitations as well as their usefulness must be grasped. When this is done the accounts will become a strong staff and support.

If the accounts have been completely kept, the household expenses are easily assembled from the cash record, inventory and record of supplies used. Nothing in the realm of figures is more likely to astonish the average farm family than a summary of the household costs. The farm furnishes the family a house to live in, milk, butter, cream, eggs, pork, fowls, fuel, vegetables, and fruit, and often a great many other things. Yet the farmer often does not think of all these unless they are set before him. If he breaks even on the year he is likely to think there is no profit in the business when, in fact, he

may have been living much better than the average city business man of like education, attainments, and capital.

AGRICULTURAL INDUSTRIES

Detection of Adulterations in Maple Products.—JONES, C. H., in *Proceedings of the Vermont Sugar Makers' Association*, 1917, pp. 25-30.

A brief description is given of the methods in use for detecting adulteration in maple sugar and syrup. A table is included of the percentage of total ash, insoluble ash and malic acid in various sugars.

Studies in Processing Milk.—JUDKINS, H. F., and DOWNS, P. A., in *Connecticut Experiment Station Bulletin* 99, pp. 449-470, Storrs, Conn., 1918.

The various studies included in this Bulletin deal chiefly with clarification, pasteurization, and cooling after pasteurization, with particular reference to bacterial count and the cream line.

The clarification of both raw and pasteurized milk was found to cause an apparent increase in the bacteria count. The clarification of raw milk produced an average reduction in the cream line of 0.43 per cent, while in the case of pasteurized milk the reduction was 0.9 per cent. The reduction in both cases is so slight that it would be impossible to detect it in the ordinary milk bottle.

Very little difference was found between the vat and the in-bottle methods of pasteurization in regard to bacterial efficiency. The average efficiency for the vat is 99.95 per cent and for in-bottle pasteurization 99.96 per cent. The reduction in cream line of vat pasteurized milk when cooled in the vat was 2.9 per cent, and when cooled over the cooler 1.5 per cent. Both reductions are so small that they would scarcely be noticed on bottled milk. In the case of in-bottle pasteurization there was no apparent reduction in the cream line. The higher the temperature to which the milk was heated the greater was the reduction in cream line. In vat pasteurization this reduction was found to take place mostly during the holding and cooling process.

The time and water required for cooling were slightly lower in the case of the vat cooling. The latter is also considered preferable because less equipment is needed. The air-blast method of cooling in-bottle pasteurized milk is regarded as very satisfactory. The vat and in-bottle methods of cooling were both found ideal as far as the bacteria count is concerned. The cooler method showed an average increase of 3,664 bacteria per cubic centimeter in milk passing over it.

The pumping and bottling of pasteurized milk with equipment cleaned in the ordinary manner is considered a great source of recontamination. In the tests an increase of 11,755 bacteria per cubic centimeter was due to the pump and pipe line, while the bottler added 35,838 per cubic centimeter more.

Milk pasteurized in the bottle showed a bacteria content of 352 per cubic centimeter, while the same milk pasteurized in a vat showed 439 per cubic centimeter. This same milk bottled showed an increase of 47,594 bacteria per cubic centimeter, a large percentage, of which were liquefiers. The use of chloride of lime solution in flushing out all equipment before processing milk was found to do away with practically all recontamination of milk after pasteurizing.

PLANT DISEASES

Apple Spraying Experiments.—MORSE, W. J., in *Maine Agricultural Experiment Station Bulletin* 271, pp. 101-128. Orono, Me., 1918.

This publication constitutes the seventh and eighth annual reports of progress with apple spraying experiments. In the period covered by the present publication, Ben Davis trees were sprayed. In 1916 applications were made of lime-sulphur and Bordeaux mixture, to which lead arsenate, 1 lb. to 50 gal., was added. In 1917 the treatment was confined to applications of lime-sulphur and various forms of lead arsenate and lime arsenate. The weather conditions in both years, particularly in the early part of the season, when infection occurs and the distribution of scab is most rapid, are said to have been externally favourable for the development of disease.

In 1916 every spray material used showed marked scab control. On the other hand, the efficiency of the spray materials in 1917 was exceedingly low. This is believed to have been due to the abnormal weather conditions of 1917, which delayed the first two applications. Regardless of seasonal conditions, Bordeaux mixture caused much damage both by leaf injury and by fruit russetting, although almost perfect scab control was secured.

In 1916 lime-sulphur combined with lead arsenate gave efficient scab control, but there was also a large amount of russetting. The variety Ben Davis is said to be exceedingly subject to russetting, and with any other variety equally subject to scab and less susceptible to spray injury, there is considered to be abundant evidence that spraying with either fungicide combined with acid lead arsenate will, as a rule, be exceedingly profitable. The experiments reported showed that arsenate of lead alone has considerable fungicidal value, and the same seems to be indicated of lime-sulphur when no arsenical is employed. Tests of dry lime-sulphur showed that it was about as efficient as home-made lime-sulphur of similar concentration.

In comparisons of lime arsenate and lead arsenate, the results of the experiments conducted in both seasons were decidedly in favour of lime arsenate. The author reports that data are being collected on the effect of spray treatment on the set of fruit.

AGRICULTURAL ECONOMICS

CO-OPERATION FOR THE SALE OF PRODUCE IN CALIFORNIA

The development of co-operation for the sale of agricultural produce in California was described in an article in *The AGRICULTURAL GAZETTE* for March, 1919, p. 310. The particulars here given are taken from an article in the *Institute Economic Bulletin* based on the third annual report of the state market director of California.

Central California Berry Growers' Association.—The primary object of this society was to protect the growers of strawberries against the loss frequently incurred in marketing a commodity so highly perishable. The directors of the association decided not to establish any new marketing system, but to supervise existing market facilities. All selling was done through the commission houses, but a minimum price was fixed, based upon the cost of producing strawberries and of delivering them to the markets.

As the markets of San Francisco and Oakland have not the capacity to consume all the strawberries produced by the members at this minimum price, it was arranged that all strawberries not finding sale at this price on the open market should be diverted to a cannery at a certain hour each day, in order to avoid further loss by deterioration. Whenever there was likelihood of the market being oversupplied, a certain percentage of the crop was delivered directly to certain canners and preservers, with whom the association had arranged for such deliveries.

Under this system the consuming public was supplied with clean, fresh stock every morning, at no material advance in cost, while the producers secured a better general average price per case than they had previously been able to obtain and the usual glut at the height of the season was prevented.

The co-operative marketing of strawberries has proved so successful that the association has undertaken to organize the sale of other varieties of small fruit.

California Pear Growers' Association.—This association was formed in 1917 with the primary object of marketing the canning pears grown by its members. It was not, however, until the harvest period of 1918 that it was able to handle the crop.

The results of the first year's operations were most satisfactory. In 1917, when there was no organization, growers who sold to a cannery, received from \$25 to \$40 a ton, a price which in many cases meant a loss instead of a profit. The costs of production were, moreover, increasing, and the association, after an investigation, estimated that prices of \$70 a ton on No. 1 pears and \$35 on No. 2 pears were necessary in 1918 to ensure a profit on well managed orchards.

It was found that there were about 6,000 tons of pears under long-term contracts, and the association held a conference with a committee of canners, as a result of which the canners agreed to advance the 1918 price \$10 a ton. Besides the pears affected by these contracts, the association had an equal quantity for sale to canneries. At first the canners hesitated to purchase at the association's price, but at the end of July orders had been booked for every ton at its disposal, and it could have sold a considerably larger quantity had it been available. The total gain to the growers, as compared with 1917 prices, is calculated at \$238,619.

California Peach Growers.—No association in California has rendered more striking services to its members than the California Peach Growers. Prior to its organization the price of dried peaches had fallen to about 3 cents a pound, whereas the cost of production was about 5 cents a pound. The association was formed in time to handle the dried peach crop for 1916, and it was able to secure for the grower an average price of 6 cents a pound. For the season 1917-18 the grower received through the association a further increase in price, the average price being 8-32 cents per pound.

This price was received despite the largest dried peach crop in the history of the State. Out of the 40,000 tons produced during the season the association sold 32,000 tons, or about 75 per cent.

The association has done much to improve the methods of harvesting and curing the fruit. It has also developed a process for peeling peaches at a nominal cost, which makes it possible to put on the market peeled dried peaches at substantially the same price formerly charged for the much less attractive unpeeled peaches.

Economies have also been effected in packing materials. Mountain timber land was purchased, and a saw-mill and a box factory were built.

At the end of two years' operations the association has to its credit in capital and surplus \$1,062,344.

California Prune and Apricot Growers.—After handling about \$9,000,000 worth of prunes in its first season (1917), the California Prune and Apricot Growers had a set-back in 1918 owing to the partial failure of the crop. It began, however, to undertake the sale of apricots and after entering into contracts assuring a fair market, was able to offer the growers an apricot contract, guaranteeing them an initial payment in excess of prices paid at any time during the previous season, and further payments bringing the price up to about \$40 per ton. During

the season of 1917 the growers received in no instance more than \$30 per ton and in many cases much less.

In one of its recently purchased packing houses the association has erected a plant for the extraction of kernels. In another, it is manufacturing small apricots into jam. It has also made a start in the canning of dried fruit products, especially prunes.

The association now numbers more than 6,000 members and has a paid-up capital of over a million dollars.

The Poultry Producers of Central California.—Beginning business in February, 1917, with a capital of \$10,000, this association had at the end of twenty months' business a paid-up capital of \$144,000. In the first eight months of 1918 its sales amounted to \$2,599,152, an increase of nearly 100 per cent over the corresponding period of the previous year.

Owing to the smallness of its initial capital and to its lack of experience, the association adopted for its first year's business the comparatively simple plan of entering into a contract with 26 San Francisco wholesale produce merchants to take the entire output of eggs from the association at the daily prices quoted in the Produce Exchange. It was further agreed that the association should be admitted to membership of the Exchange with a representative who should have full privileges, as a protection against the manipulation of prices.

The system had the disadvantage that the highest prices the association could hope to obtain were the Produce Exchange prices, and it was easy for produce merchants unfriendly to the association to offer a slightly better price than could be obtained through the association. A certain number of the poultrymen who had contracted to sell all their eggs to the association broke their contracts and had to be brought into court to compel them to fulfil their obligations.

At the end of the first year, it was decided that the association was in a position, by virtue of its increased capital and its broadened experience, to do its own selling and to develop its own retail, shipping and export business. Although some mistakes were made, the results were satisfactory. In January, 1918, only 2 per cent of the output was sold to retail traders, but by the end of August the proportion so sold had increased to 20 per cent and the shipments to outside trade amounted to 25 per cent of the output. In the first six months of 1918, the eggs sold by the association amounted to 39 per cent of the eggs sold on the San Francisco market.

The increased capital of the association made it possible to undertake to store eggs during the flush season instead of forcing them on the market to be sold at low prices. Over \$250,000 worth of eggs were stored in 1918 and the financial position of the association was such that it was able to pay its members the full current market value in cash for such eggs. The members were not, therefore, obliged to wait for part or all of their returns until the eggs were sold.

In the 34 weeks ending 25th September, 1918, the association handled 212,097 cases of eggs for which a total sum of \$2,603,488 was received. The cost of working was 2.1 per cent of the sales.

The Poultry Producers of Southern California.—This association, which was organized in the latter part of 1916, began with an even smaller capital than the Poultry Producers of Central California, but it started at once to do direct marketing with the trade generally. It had to face the keen opposition of the Los Angeles produce merchants, who, by employing the same tactics as those of San Francisco, induced some of the members to break their contracts with the association. Test cases were brought into court and for the defence it was contended that the association was in the nature of a monopoly. This contention was not upheld by the judge, who in delivering judgment said, "I am satisfied that the purpose for which the corporation was formed was not to create a monopoly but to stabilize the production of eggs for the purpose of serving the public and in the interests of both the consumer and the producer."

This decision had a wholesome effect in settling issues vital not only to the Poultry Producers of Southern California, but to every co-operative association in California as well. From the day the decision was rendered the association has made steady progress.

At the direction of the association some extremely valuable charts have been prepared showing the cost of egg production in Southern California for a series of years.

Associated Dairymen of California.—With one exception all the large co-operative dairy associations of California belong to the federation formed in 1917 under the name of the Associated Dairymen of California, Inc. While the local associations undertake the manufacturing of the products, and also market milk and sweet cream produced by their members, the Associated Dairymen of California markets the manufactured products, such as butter, cheese, casein, sugar of milk, evaporated milk, condensed skim milk, powdered milk, etc. The Associated Dairymen will also do collective buying for the local associations.

Northern California Milk Producers' Association.—Organized in 1917, this association covers eighteen counties in the north of California, and has between 900 and 1,000 members. It is not yet active all over the territory, but is extending its work in the different districts as fast as arrangements can be completed. Its first work was to market whole milk and it was able to return to the dairymen 30 cents per gallon for milk delivered in the city, as compared with the 10 cents which they had previously obtained. The Orland Creamery, a farmers' co-operative creamery, has been acquired and considerably enlarged. In Sacramento a large plant is being constructed which will be used for the

handling of whole milk and sweet cream and the manufacture of butter, cheese and other products.

Milk Producers of Central California.—This association covers five counties in Central California and the number of cows owned by its members numbers approximately 26,000. It furnishes the greater part of the milk supply of Stockton, Oakland and other bay cities. At the time the report was written it was manufacturing about 96,500 pounds of butter daily at two creameries which it had purchased. It has also entered into contracts for the construction of a large milk sugar factory, capable of dealing with 150,000 pounds of milk per day.

Though paying the members a higher price for milk than they had previously obtained the association has been able to set aside large sums to pay off the indebtedness on its manufacturing plants. It is anticipated that within a year or two the association will own buildings and plant to the value of \$250,000, free of encumbrances.

Associated Milk Producers.—Organized in 1916, this association has gradually increased its business and now furnishes approximately 95 per cent of the milk distributed in San Francisco. It numbers about 200 members. Only milk-producers are admitted and each member must furnish at least 10 gallons of milk daily.

The association has contracted with the milk distributors in San Francisco to furnish each of them with the milk he requires for his customers. The members receive a uniform price for their milk. From January 1 to March 31, 1918, the price was 28 cents per gallon; from April 1 to August 31, 25 cents; from September 1, 31 cents.

On each gallon of milk which it handles the association receives $1\frac{1}{4}$ cents. In return for this, it sees that the members' milk gets to the purchaser in good condition; that it is properly tested to ascertain its correct butter-fat content and to ensure that it is not above the required acidity. It also collects the accounts of the milk sold. Further, it employs inspectors to visit the dairies of the members and to see whether they are in proper sanitary conditions.

The association is contemplating the establishment of a co-operative buying department for the benefit of its members and the construction of a milk product plant.

Interesting information is also furnished in the article in the Institute Bulletin on the activities of the California Tomato Growers' Association, the California Associated Olive Growers, the Alfalfa Growers of California, the California Bean Growers' Association, and the California Honey Producers' Exchange.

CONTENTS OF THE INSTITUTE ECONOMIC BULLETIN

In addition to those already dealt with herein, the following is a list of the more important subjects treated in the June-July number of the International Review of

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AGRICULTURAL STATISTICS

THE 1919 CROPS OF THE NETHERLANDS

Crop	1919	1918	5 years' average 1913 to 1917
	Bushels	Bushels	Bushels
Wheat	6,015,000	4,823,000	5,211,000
Rye	14,057,000	10,207,000	14,017,000
Barley	2,688,000	2,175,000	2,791,000
Oats	19,305,000	16,172,000	20,005,000
Flaxseed	202,000	117,000	271,000
Potatoes	96,226,000	94,795,000	98,624,000
	Tons	Tons	Tons
Sugar beets	1,709,000	1,317,000	1,885,000

UNITED STATES NOVEMBER CROP REPORT

The following tables give the estimates of the United States for 1919 compared with the area and production of several crops in the final figures for 1918.

Crops	Area		Production	
	1919	1918	1919	1918
	Acres	Acres	Bushels	Bushels
Corn....	102,977,000	107,494,000	2,910,250,000	2,582,814,000
Buckwheat..	840,000	1,040,000	20,120,000	17,182,000
Flaxseed....	1,851,000	1,938,000	9,450,000	14,657,000
Kaffir Corn	5,183,000	5,619,000	123,343,000	66,396,000
Potatoes....	4,003,000	4,210,000	352,025,000	400,106,000
Sweet Potatoes	1,023,000	922,000	102,946,000	86,334,000

FOREIGN CROP CONDITIONS

(From Broomhall)

United Kingdom.—On October 20 the weather prevailing in the United Kingdom was most favourable for ploughing and sowing of winter cereals. Autumn field operations were well advanced, and a fair cereal acreage already seeded.

Belgium.—Cereal crops are reported to have turned out poorer than was anticipated. The yields of wheat and rye were below the average.

France.—The official estimate of this year's crop gives a very small quantity, so that the indicated import requirement is very large. The official estimates of the 1919 crops are: wheat 178,000,000 bushels, against 234,000,000 in 1918 and 320,000,000 in 1913; oats 158,501,000 bushels, against 177,930,000 last year and 378,000,000 in 1913. At the middle of October ploughing and sowing were being carried on actively and a considerable increase in the wheat acreage was expected. From some districts there were complaints of excessive dryness, although in other regions rain has been abundant.

Spain.—Early in November seeding conditions for new crops were very favourable, and good progress had been made. Indications are that a full wheat acreage will be seeded.

Germany.—Labour difficulties hindering the harvesting of potatoes are reported in sections. The total out-turn of grain this year was about the same as that in 1918. The production of potatoes and other root crops is appreciably less than last year. On October 20 the sowing of winter cereals had been much delayed by drouthy weather.

Roumania.—At the middle of October it was reported that the sowing of new crops was being greatly hindered by drouthy weather. Later reports state that the desired rains have fallen and ploughing and seeding were progressing. The exportable surplus of wheat from the 1919 crop is estimated at 18,000,000 bushels.

Russia.—There have been good wheat crops in South Russia, and there is a large exportable surplus. The crops in the central districts are reported sufficient for local needs.

Sweden.—During October the weather was favourable.

Italy.—Reports say that a large acreage will be put to wheat this season. There is, however, great unrest among agricultural labourers.

North Africa.—Early in November the weather was reported favourable and conditions good.

India.—The crops are making satisfactory progress everywhere, but at the middle of October rain was needed in the Punjab and the North-Western Provinces. Early in November the weather was fine and favourable to seeding of new crops.

Argentina.—The area of the coming wheat crop to be harvested in Argentina is officially estimated at 14,957,000 acres, compared with 16,970,000 acres last year, a decrease of about 2,000,000 acres; oats 2,300,000 acres against 2,980,000 in 1918, and flaxseed 3,520,000, against 3,400,000 last year. The condition of wheat, oats, and flaxseed continues excellent. It is estimated that 120,000,000 bushels of the last crop of wheat are still held, and the new crop is expected to give a surplus of 160,000,000 bushels. This would give a surplus of 280,000,000 bushels available for export.

Australia.—Our October 10 crop prospects were reported as good in Western Australia, moderate in Victoria and South Australia, and poor in New South Wales. Rainfall was unequally distributed and drought prevailed in some sections. It was later reported that useful rains had fallen. The production of wheat is expected to be considerably less than last year's crop of 73,000,000 bushels.

WHEAT PRODUCTION IN CHINA

(From "The Economic World," New York, March 8, 1919.)

As in the case of cotton, the greatest statistical uncertainty exists as to the amount of wheat annually grown in China.

It is known that the consumption of wheat, in the form of flour, has been increasing with considerable rapidity in all sections of China.

except the southern provinces, where rice is the staple article of food. It has also been known that in the northern provinces the production of wheat is carried on upon an extensive scale and that the products of wheat form an important part of the food of the population. Only vague guesses as to the amount of this production, however, have been available; nor has it been known whether or not in the course of time China might be expected to take its place among the wheat-exporting countries of the world. Some light is thrown upon these questions by a recent report to the Department of Commerce, Washington, from Mr. Julien Arnold, United States Commercial Attaché, Peking. Mr. Arnold writes:

"It is impossible to estimate with any degree of satisfaction the amount of wheat grown in China. It is the staple crop of North China, just as rice is the staple of South China. It would seem that 200,000,000 bushels would not be an unsafe estimate. In Manchuria the yield is estimated at less than 20 bushels to the acre, giving a total for all Manchuria of 60,000,000 bushels. In Shantung, where there is intensive cultivation and fertilization, the yield reaches 40 bushels to the acre, as also in the Wei Basin in Shensi, but in many parts of China it does not exceed 10 or 15 bushels. The question is only one of economic transportation in the wheat-growing sections; the solution of this problem will place China in the category of flour-exporting nations."

WHEN CROPS ARE HARVESTED IN THE UNITED STATES

(From the U. S. Crop Reporter, October, 1919.)

The tabulation below shows when crops are harvested in the United States by showing what proportion of the crop is usually harvested each month. Two factors tend to modify these percentages in any given year. In some years harvests come somewhat earlier or later than normal. Also, if the crop is larger than usual in its northern

section, and smaller than usual in its southern section, or vice versa, the effect is to modify the percentage of the total crop which is harvested in a particular month. However, it is not likely that such changes from normal are often so marked throughout the United States as to alter greatly the averages here given.

Percentage of Crops of United States harvested monthly

	January to April	May	June	July	August	Sept.	Oct.	Nov.	Dec.
	p.c.	p.c.	p.c.	p.c.	p.c.	p.c.	p.c.	p.c.	p.c.
Barley		1.2	8.2	51.6	33.9	4.0	0.2		
Buckwheat				0.8	6.7	64.9	26.7	0.9	
Corn			0.1	0.1	1.5	15.8	28.3	43.3	10.9
Oats		1.0	7.9	52.9	34.2	3.8	0.2		
Rice				0.9	15.3	33.0	33.8	14.6	2.4
Rye		0.2	11.3	71.5	16.3	0.7			
Wheat		0.5	22.0	42.3	28.4	6.5	0.3		
Apples		0.1	2.5	7.2	12.5	27.7	45.5	4.5	
Blackberries	0.1	1.8	15.4	47.6	27.1	6.2	1.7	0.1	
Cantaloupes	0.3	1.8	8.7	20.9	36.7	28.6	3.0		
Cranberries					7.3	67.1	25.6		
Grapes			0.1	3.5	15.2	48.0	29.8	3.4	
Peaches		1.6	7.9	23.4	34.3	26.9	5.9		
Pears		0.1	0.4	7.5	25.1	44.4	21.5	1.0	
Raspberries		0.5	16.5	58.4	21.7	2.8	0.1		
Strawberries	4.8	23.6	49.4	18.3	3.1	0.6	0.1	0.1	
Watermelons		0.4	5.2	27.3	39.8	24.1	3.2		
Beans (dry)				0.8	13.8	54.9	26.9	3.6	
Beans (lima)	0.1	0.7	3.4	8.4	22.1	43.4	20.4	1.5	
Cabbage	4.2	2.3	4.7	6.8	9.1	18.1	40.4	14.0	0.4
Onions	1.7	4.4	8.7	12.6	17.2	32.5	21.9	1.0	
Potatoes	0.2	1.3	3.3	6.8	12.1	33.7	39.2	3.3	0.1
Sweet Potatoes	0.1		0.1	1.7	6.2	21.5	49.1	20.6	0.7
Tomatoes	3.1	1.3	3.8	11.4	29.2	39.7	9.7	1.5	0.3
Hay, all	0.2	2.2	15.3	47.8	21.8	10.7	1.9	0.1	
Alfalfa	0.9	5.3	24.1	28.0	21.5	16.4	3.7	0.1	
Alfalfa seed			0.6	10.7	30.5	45.1	13.0	0.1	
Bluegrass seed		5.1	43.0	23.6	16.4	11.4	0.5		
Clover seed			0.2	3.4	21.2	54.4	20.0	0.8	
Millet		0.2	1.7	16.4	40.5	37.2	4.0		
Timothy hay			7.1	73.6	17.8	1.5			
Timothy seed			0.8	36.1	54.0	9.1			
Wild hay	0.2	0.6	4.1	28.9	36.5	26.4	3.3		
Broom corn			2.8	9.7	29.0	43.1	14.4	1.0	
Cotton	0.4			1.4	11.5	31.6	34.4	16.0	4.7
Flaxseed			0.1	3.0	31.5	56.5	8.9		
Hops				1.1	27.6	63.6	7.7		
Peanuts			0.1	2.1	12.5	39.3	37.7	8.0	0.3
Sorghum (syrup)			0.1	1.4	13.3	51.9	30.9	2.4	
Sugar beets				1.0	3.8	18.5	56.3	20.2	0.2
Tobacco			0.6	7.5	27.1	52.7	12.1		

IMPORTS AND EXPORTS OF WHEAT AND FLOUR

(Flour expressed in equivalent quantities of wheat.)

(Thousands of Bushels.)

Countries	Imports				Exports			
	August		First eight months Jan. 1st to Aug. 31st		August		First eight months Jan. 1st to Aug. 31st	
	1919	1918	1919	1918	1919	1918	1919	1918
Denmark	94	22	243	300	3	0	437	5
Great Britain and Ireland	19,047	12,681	113,092	108,890	22	33	244	229
Italy	9,917	9,098	67,201	50,982	35	15	630	188
Roumania	316		8,504		0		0	
Canada	3	2	36	45	9,562	3,790	77,069	68,058
United States	188	998	6,686	15,307	20,310	19,496	185,146	100,477
India	262		6,872		216		1,425	
Egypt	30	16	701	408	0	20	0	122
Tunis	2	0	7	0	301	82	3,267	341
Argentina					13,528	12,820	61,592	90,132
Australia					10,508	3,620	69,908	21,980

SOURCES OF THE FOOD SUPPLY OF THE UNITED KINGDOM

(From the *National Food Journal*, London, July 9 and October 15, 1919)

The following three tables show, for the United Kingdom, respectively, the relation between home and imported supplies in the case of the leading foods before and during the war, the chief countries or continents

from which such foods have been secured, also before and during the war, and lastly the percentage of the total supply of many foods obtained from the United Kingdom, from the other parts of the British Empire, and from foreign countries.

Home and Imported Supplies, 1909-13 and 1918.

(Principal Foodstuffs)

Commodity	1909-13			1918		
	Total Supply	Per cent Home	Per cent Imported	Total Supply	Per cent Home	Per cent Imported
Wheat and Flour	Tons 7,503,000	21.3	78.7	Tons 7,111,000	35.1	64.9
Total Cereals	16,666,000	37.7	62.3	15,318,000	55.7	44.3
Total Meat (except Bacon and Hams)	2,111,000	64.3	35.7	1,517,000	57.8	42.2
Bacon and Hams	399,000	31.3	68.7	673,000	10.6	89.4
Butter	334,000	37.7	62.3	182,000	56.6	43.4
Margarine	118,000	50.8	49.2	254,000	94.1	5.9
Cheese	158,000	25.3	74.7	159,000	25.8	74.2
Sugar	1,814,000		100.0	1,306,000		100.0
Potatoes	7,077,000	96.3	3.7	9,274,000	99.4	0.6

Sources of Imported Supply, 1913 and 1918.

(Certain Principal Foodstuffs)

	Wheat and Flour		Total Meat (except Bacon and Hams)		Bacon and Hams		Sugar		Dairy Produce	
	1913	1918	1913	1918	1913	1918	1913	1918	1913	1918
	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per ct	Per ct.
Europe	5.0		6.2		49.0	0.2	76.8	1.1	74.6	12.6
U. S. A.	34.7	52.3	1.6	31.2	44.9	83.7	0.2	0.4	0.2	37.8
Canada	22.5	25.1	0.1	5.0	5.8	15.2			10.4	20.6
South America	12.9	15.5	54.9	38.4			1.7	3.8	0.6	4.5
Australasia	8.7	4.6	36.5	22.5					11.3	22.2
Other Countries	16.2	2.5	0.7	2.9	0.3	0.9	21.3	94.7	2.9	2.3
Total Imports— 1,000 tons	6,126	4,632	878	660	286	601	1,969	1,306	621	360

¹ Principally Cuba and Java.

Sources of Supply in 1913, Distinguishing Between Home Production, Supplies from other Parts of the Empire, and Supplies from Foreign Countries.

Commodity	United Kingdom	Rest of Empire	Foreign Countries
	Per cent	Per cent	Per cent
Wheat and Flour.....	20	37	43
Rice.....	57	59	41
Barley.....	76	12	31
Oats.....	76	3	21
Maize.....	64	1	99
Total Meat (except Bacon and Hams).....	64	13	23
Bacon and Hams.....	31	4	65
Lard.....	21	3	76
Fish.....	81	6	13
Milk, fresh.....	100	.....	.....
Milk, condensed.....	46	.....	54
Butter.....	38	13	49
Cheese.....	25	60	15
Margarine.....	51	.....	49
Potatoes.....	94	1	5
Sugar.....	.....	4	96
Tea.....	.....	86	14
Coffee.....	.....	11	89

Though the imports during the war from the Dominions and other parts of the Empire give no indication of those possible in the future, as these were curtailed by the lack of transport rather than output, some account may be given by way of information.

The export of refrigerated beef and mutton from Australia to the United Kingdom rose from 90,000 tons in 1911 to 190,000 tons in the year ended June, 1915, but, consequent on the drought and war conditions, the amount fell to 65,000 tons in the following year. The imports of meat into the United Kingdom from Australia in 1918 amounted to 62,000 tons, but this year, while the imports of beef showed a considerable decline, those of mutton have increased enormously, and it is stated that increasing attention is being paid to the breeding of a class of sheep that will best meet the requirements of consumers. In New Zealand the number of cattle slaughtered for food purposes rose from 117,000 in the year ended March 31, 1906, to 347,000 in 1914-15, while the weight of beef exported increased from 7,800 tons to over 35,000 tons. During the same period the export of frozen mutton and lamb increased from 70,000 tons to nearly 120,000 tons. The importation of meat from Canada has shown a progressive increase in each year of the war, and in 1918 amounted to 33,000 tons, while that of bacon and hams has increased from 20,000 tons in 1914 to 91,000 tons in 1918, and it is probable that this figure will be exceeded this year. With the practical elimination of Denmark as a source of supply, there should be a great future for Canadian bacon in the United Kingdom.

In 1910 there were 3,635 factories and creameries for the production of cheese and butter in Canada, while the corresponding figures for Australia and New Zealand in the year 1915 were 536 and 532 respectively. The output of cheese in Canada in 1917, amounted to 87,000 tons, and of butter to 39,000 tons; in addition, a large quantity of butter was made on the farm. In Australia and New Zealand the quantity of cheese produced in 1915 was 7,100 tons and 40,900 tons respectively, and of butter 61,400 tons and 31,300 tons respectively. The butter produced in Australia in the season of 1916-17 amounted to 81,500 tons, while the maximum annual output was that of 1911, when 94,000 tons were produced.

The imports of Colonial cheese have always formed a considerable proportion of the total imports into the United Kingdom; in 1918 the figure was 75 per cent, while this year the proportion is likely to be still greater. The imports of butter from British possessions last year were 62 per cent of our imported supply, but owing to a decrease in the imports from Australia, the figure will hardly be as high in the current year.

The area under sugar-cane in Mauritius increased from 71,000 acres in 1900 to 175,000 acres in 1916. In 1918 the imports of sugar into the United Kingdom from Mauritius amounted to 99,000 tons, or nearly 8 per cent of our total supply, while they reached over 100,000 tons in the first half of this year. The imports from the West Indies and Guiana also show an improvement as compared with last year.

WORLD'S 1919-20 SUGAR CROP ESTIMATES

(Weekly Statistical Sugar Trade Journal, Nov. 6 1919)

Production of sugar throughout the world is at last showing an increase over that of the previous campaign. The increase, although small, is at least an increase, and puts a check on the continually declining sugar production since the beginning of the war. Our figure for the world's sugar crop for the 1919-20 campaign just starting is for a total of 16,600,000 tons against last year's outturn of 16,320,654 tons, or an increase of 279,346 tons.

Of course, while production has at last indicated a tendency to increase, it still has a great way to go to equal the record crop of 1913-14, the outturn of which, as published by us, was 18,677,399 tons. The spread of prohibition is causing augmented demand for sugar for consumption, so that it would not be surprising if a production of more than 20,000,000 tons will be necessary within a few years to inaugurate a free supply of sugar for all localities, such as obtained in pre-war times.

On the other hand, it is considered that Cuba has reached 4,000,000-ton crops, and there is more likelihood of its exceeding than falling short of this amount. Then, too, the beet sowings by the central European powers will tend to increase with fair rapidity, as sugar is one of the quickest and most convenient methods of obtaining an export commodity by means of which to settle those countries' external debts resulting from the war. In other words, the tide has turned and the future holds much of promise.

Cane Crops.—Advices from the cane crops in general are favourable, and material increases are reported in several instances. Cuba indicates an increase of at least 300,000 tons, Argentina 120,000 tons, India 500,000 tons, Philippine Islands 50,000 tons, Australia 50,000 tons, San Domingo 20,000 tons. Other West Indies report increases in good proportion to their crops. The Java crop, now about ending, and which we include in the 1919-20 table because the next crop will not be available until May-June, 1920, will outturn only 1,300,000 tons. The 1920 crop, however, will probably show an increase to 1,600,000 tons. Formosa will have a shorter crop than usual, owing to unfavourable weather conditions and heavy storms.

Regarding Cuba, the general reports are very favourable, owing to exceptionally good growing weather throughout most of the island. It is generally conceded that there will be cane available for a crop of 4,500,000

tons, but it is hardly likely that the full quantity of cane will be harvested, as many factors have to be taken into consideration particularly weather conditions and labour questions. We prefer to calculate on a crop of 4,300,000 tons, subject to change as conditions warrant.

Porto Rico and Hawaii call for no particular comment, but both crops indicate small increases.

The grand total of cane is 12,261,000 tons, against last year's figure of 11,965,030 tons.

European Beet Crops.—In estimating the outturn of the European beet crops, there are several outside factors that will have to be considered beside the area sown and the sugar content and weight of the beets. The most important matter to be considered is the scarcity of coal, which will allow a distribution of only 50 to 60 per cent of the sugar factories' usual consumption. Other factors are the disturbed political conditions, scarcity of railroad cars and other method of transportation, labour, etc.

Germany.—F. O. Licht states that there are sufficient beets planted to produce a crop of 1,700,000 or 1,800,000 tons, while the Government states that 900,000 tons will be the maximum. Possibly halfway between these two extremes will be about the approximate outturn, so for the present we estimate the German crop at 1,300,000 tons.

Former Austria-Hungary.—Czechoslovakia should produce 700,000 tons. In Hungary the industry has become badly demoralized, and not above 50,000 tons will be produced.

France, Holland and Belgium.—There is nothing special to say about these countries. France will produce a poor crop, 150,000 tons, while in Holland and Belgium the crop situation is much improved over the preceding season.

Russia.—The demoralized condition of Russia precludes the possibility of any sugar crop to amount to anything. The principal crop was formerly raised in the Ukraine and Poland, so these two countries will produce in the future the largest part of "Russia's" crop. The Ukraine is expected to produce this year 215,000 tons, Poland 65,000 tons, and Greater Russia 70,000 tons, say a total of 350,000 tons.

Three Years' Comparative Figures.—Preliminary figures (in long tons) for the 1919-20 crop in the various sugar-producing countries of the world and final estimates for the two preceding campaigns appear below:

Countries	1917-18	1918-19	1919-20
	Tons	Tons	Tons
United States:			
Louisiana.....	217,499	250,802	125,000
Texas.....	2,009	3,125	2,000
Porto Rico.....	405,174	375,000	400,000
Hawaiian Islands.....	515,035	535,000	560,000
West Indies—Virgin Islands.....	5,400	9,000	12,000
Cuba.....	3,446,083	4,000,000	4,300,000
British West Indies:			
Trinidad.....	45,256	47,850	65,000
Barbados.....	65,230	80,000	70,000
Jamaica.....	34,300	40,000	50,000
Antigua.....	9,409	10,000	12,000
St. Kitts.....	8,846	10,000	10,000
Other British West Indies.....	16,745	10,000	10,000
French West Indies:			
Martinique (exports).....	20,881	30,000	30,000
Guadeloupe.....	28,000	25,000	25,000
San Domingo.....	127,322	158,309	180,000
Haiti.....	.....	3,300	5,000
Mexico.....	40,000	40,000	40,000
Central America.....	25,000	30,000	30,000
South America:			
Demerara (exports).....	114,007	93,902	100,000
Surinam.....	9,739	8,000	12,000
Venezuela (exports).....	15,000	15,000	18,000
Ecuador.....	8,000	7,000	7,000
Peru.....	265,000	250,000	250,000
Argentina.....	87,699	130,266	250,000
Brazil.....	148,958	260,000	175,000
Total in America.....	5,660,592	6,421,554	6,738,000
British India (consumed locally).....	3,311,000	2,337,000	2,800,000
Java.....	1,778,345	1,749,408	1,300,000
Formosa and Japan.....	397,618	115,678	300,000
Philippine Islands.....	216,260	150,000	200,000
Total in Asia.....	5,703,223	4,652,086	4,600,000
Australia.....	325,900	226,000	275,000
Fiji Islands.....	70,800	80,000	60,000
Total in Australia and Polynesia.....	396,700	306,000	335,000
Egypt (consumed locally).....	79,450	82,000	90,000
Mauritius.....	225,466	252,772	242,000
Reunion.....	50,000	50,000	50,000
Natal.....	106,250	144,000	150,000
Mozambique.....	50,000	50,000	50,000
Total in Africa.....	511,166	578,772	582,000
Europe: Spain.....	7,039	6,618	6,000
Total cane-sugar crops.....	12,278,720	11,965,030	12,261,000
Germany.....	1,541,061	1,411,900	1,300,000
Czechoslovakia, etc.....	668,250	700,000	750,000
France.....	200,265	110,096	150,000
Belgium.....	131,000	75,000	125,000
Holland.....	199,295	174,436	250,000
Russia (Ukraine, Poland, etc.).....	1,028,580	700,000	350,000
Sweden.....	125,000	19,000	140,000
Denmark.....	115,000	130,000	130,000
Italy.....	100,000	100,000	150,000
Spain.....	134,955	135,000	120,000
Switzerland.....	4,000	4,000	4,000
Total in Europe.....	4,247,406	3,658,432	3,469,000
United States.....	682,867	674,892	850,000
Canada.....	11,250	22,300	20,000
Total beet-sugar crops.....	4,941,523	4,355,624	4,339,000
Grand total, cane and beet-sugar.....	17,220,243	16,320,654	16,600,000

American Beet Crop.—The foregoing table presents a revised estimate of the outturn of domestic beet sugar expected during the present (1919-20) campaign, as compiled from the reports of the factories. The acreage to be harvested shows, in most instances, the usual average abandonment, and, in some

cases, a little more, owing to local conditions. It is now likely that the harvest will be gathered from about 750,000 acres, as compared with 593,640 acres actually harvested last season. Of these increases the largest are in Michigan, Colorado, and Utah. Nebraska has a good increase in proportion

and a smaller one is expected in Ohio. Wisconsin and Idaho are about the same as last year. California shows a decrease.

In view of the generally favourable conditions existing, however, with consequent increase in sugar content, we are disposed to look for a materially larger crop than the preceding one which outturned 674,892 tons of sugar, and expect an outturn of 850,000 tons with a continuance of favourable conditions.

Regarding California, the campaign started in the latter part of June, but the crop generally was late and did not get fully under way until much later. As some of the factories are experiencing shorter runs than usual, the campaign is naturally well advanced and it is consequently possible to give a close estimate of the probable outturn, which figure we place at 105,000 to 110,000 tons of sugar for the State.

LIVE STOCK STATISTICS

DENMARK.

Classification	Number			
	15 July, 1919	15 July, 1918	12 July, 1917	15 July, 1914
Total number of pigs	709,779	620,880	1,650,623	2,496,706
Pigs over four months old	5,836	6,265	9,025	12,663
Sows " " " "	100,450	97,030	138,819	282,750
Fat pigs " " " "	130,941	121,971	512,957	706,950
Young pigs 2 to 4 months old	256,550	165,561	989,822	1,494,343
Sucking pigs under 2 months old	216,002	230,053		

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